

The Use of Guided Imagery and Relaxation for the Quality of Life of
Cancer Patients Undergoing Chemotherapy

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requirements for the degree of Master of Arts

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I dedicate this research to the men and women at the Thunder Bay Regional Cancer Centre who are struggling with treatment in the hopes that they may find some comfort, and to my parents, Robert and Virginia Straw, who, with their love and encouragement have supported me throughout this undertaking, and have given me a life long example of faith and a willingness to help others.

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Abstract

This study examines, among cancer patients undergoing chemotherapy, the influence of relaxation training plus guided imagery on quality of life. Nineteen patients were randomly assigned to one of two groups. The experimental group subjects were given an audiotape containing relaxation and guided imagery and were instructed to listen daily for six weeks. The control group subjects were instructed to take time every day and relax while listening to music prepared by the investigator. All subjects completed the Functional Living Index for Cancer, the Multidimensional Health Locus of Control Scales, and the State-Trait Anxiety Inventory. In addition, physicians rated subjects' level of physical functioning using the ECOG scale, as well as the chemotherapy intensity of treatment regime. Results indicate that subjects who listened to the relaxing music reported a significant increase in quality of life from pre to post intervention, while the experimental or imagery group subjects did not. Subjects in both groups reported significant decreases in state anxiety, but only subjects in the control group reported a significant change in trait anxiety over the course of the intervention. In addition, subjects who scored lower on a measure of internal locus of control experienced the greatest improvement in quality of life over the course of the six week intervention. The results implicate the toxicity of chemotherapy as a factor influencing quality of life, and suggest that the benefits of relaxation for the patient undergoing chemotherapy can be achieved by simply taking time each day to enjoy the calming effects of music.

Introduction

Discussions of psychosocial approaches to the treatment and management of cancer are abundant in current literature (Margolis, 1985; Karlsson & Andersen, 1986; Seigal, 1989). These interventions include relaxation training and guided imagery techniques. There exists a large body of research to support the use of such techniques in the reduction of cancer pain and of distress associated with chemotherapy treatments (Barber, 1978; Hamberger, 1982). To this point, however, there is less research to demonstrate whether such psychosocial interventions have any broader clinical applications, for example, in enhancing the overall quality of life of the cancer patient, by instilling a renewed sense of personal control and satisfaction in living. Norman Cousins has discussed the need for holistic treatment in his book The Healing Heart. Cousins fought his way back from two life-threatening illnesses, each time supplementing standard medical treatment with his own form of "therapy." This included liberal amounts of humour and laughter, a firm belief in the power of his body to heal itself, and most importantly, a sense of control. He writes, "...medical treatment should seek not just to repair damage and restore vital balances but to enhance the quality of life and to help the patient overcome feelings of hopelessness and helplessness. If the physician is to be fully effective in these directions, the patient must be a responsive and appreciative partner." (Cousins, 1983). The purpose of the present study is to determine whether a brief psychological intervention comprised of daily relaxation and guided imaging techniques influences cancer

patients undergoing chemotherapy by enhancing the overall quality of life, by instilling a greater sense of personal control over health, and by reducing anxiety.

According to some authors, it may be important for the cancer patient to play an active part in his or her own treatment. Simonton, Matthews-Simonton and Creighton (1978) for example, found that those cancer patients who live longer seem to feel that they have exerted some influence over the course of their disease. They state that "an active and positive participation can influence the onset of the disease, the outcome of treatment and the quality of life" (p.12). This idea that a patient's active participation in treatment might actually influence the disease process itself is still very controversial, and it remains to be conclusively demonstrated in well controlled research that active participation in treatment is itself the causative factor in increased longevity for some patients. A further issue is whether, for example, patients who have a high need for control would do well in a treatment program which values such collaborative participation, while other patients who assume a more passive role out of implicit faith in medical technology might become unnecessarily distressed by demands for their more active participation.

Quality of Life

Regardless of how these questions are ultimately resolved, one of the goals of all treatment must be to help patients cope with the pain, discomfort and distress associated with disease and treatment. If patients can be taught through psychological interventions to cope with these issues, the overall quality of living is potentially enhanced for

them. They might eat and sleep better, enjoy more satisfying activity levels, and experience more satisfaction in work, leisure, social and family activities. Even for the terminally ill patient this can certainly be regarded as a vital component of treatment. For some individuals, such psychological interventions, which ultimately may have the effect of reducing their helplessness in the face of discomfort and distress, may in fact be instrumental in gaining increased adherence to sometimes debilitating medical treatment regimens.

So, it is not "cure" or even increased "longevity" which is the goal of psychological intervention, but improved quality of life, and the increased capacity to respond productively rather than helplessly to treatment. As previously mentioned, many studies to date have focussed specifically on the benefits of psychological interventions such as reducing pain, anxiety and nausea. In contrast, the present study will explore whether such interventions will in addition result in other less specific benefits - that is, in the general enhancement of living through the improved capacity to cope positively rather than helplessly with the challenge of recovery. If the patient's overall quality of life and sense of control is to change for the better, the impact of psychosocial interventions must be sustained outside of the treatment setting where they are taught. There is a need, therefore, to see changes in the patient's sense of personal control, level of subjective anxiety, feeling of physical well being, emotional state, sociability, family situation and satisfaction in leisure and vocational activities if our interventions are in fact having the desired effects.

With the advanced medical technology seen in recent years, cancer

treatment has meant increased survival rates for some patients. Unfortunately, many of these treatments cause distressing side effects that are more upsetting than the disease itself. Some patients undergoing treatment may find that their quality of life, eg. the satisfaction with usual activities, decreases drastically because of the treatment itself (Katz & Jay, 1984). Margolis (1985) writes, "...physicians and other medical specialists characteristically direct their energies toward the diagnosis and treatment of pathophysiology which has become increasingly narrow, technologically complex, fragmented and reductionistic. One may well marvel at medical feats performed on human patients but simultaneously feel alarm at the inadequate treatment of the minds and the spirits of these patients"(p.18). Psychological interventions, then, may be aimed at increasing the patient's quality of life, possible by reducing the unpleasantness of treatment. Perhaps if patients are offered strategies for coping with the pain and discomfort of cancer, aggressive treatment regimens may become more acceptable. Compliance with treatment might also increase for patients who can improve their quality of life. Assessing quality of life is also important if we want to understand the effects of a particular treatment. If it results in little improvement and causes terrible side effects, it may be rejected (Jones, Fayers & Simons, 1987). Assessing quality of life also allows medical personnel to compare the effects of two different treatments, as well as to provide information about a patient's level of functioning (Ganz, Schag & Cheng, 1990).

Precise and accurate measurement of quality of life is often

difficult, due to the lack of agreement on a definition (Bindemann, 1987). Assessments have often relied solely on rating scales completed by physicians. Ganz, Schag and Cheng (1990) have emphasized the need to obtain the patient's own rating of quality of life. By using only physician ratings, important information may be overlooked. Spilker (1990) has identified four major domains of quality of life, as factors to be included in its measurement. Physical status and functional abilities refer to the actual bodily capabilities of the individual. A cancer patient may deteriorate physically, either because of the nature of the disease type or due to the side effects of treatment. Feeling unwell and being unable to perform usual activities can contribute to a decrease in enjoyment of life. Psychological status should also be considered when assessing quality of life. A depressed mood and feelings of helplessness may be common among some patients. An individual's social interactions may be disrupted by poor health caused by treatment. Time spent with family and friends should also be assessed, then, when measuring quality of life (Baltrusch & Waltz, 1987). Finally, one's changing economic status can influence a change in lifestyle. Some patients may be unable to work and thus face the added burden of financial problems.

Although quality of life is a frequently mentioned term in research dealing with cancer, few studies exist of clinical trials evaluating the effects of a particular psychological treatment on quality of life (Aaronson, van Dam, Polak & Zittoun, 1986). Much of the literature examines case studies, or tends to be a discussion of issues surrounding quality of life and the cancer patient (Curtis, 1986).

Holland (1986), for example, discusses the efforts of some members of the medical community aimed at educating researchers and clinicians in methods targeted at improving quality of life for cancer patients undergoing treatment. Gotay (1987) has discussed the cognitive side effects of cancer treatment for pediatric patients. She suggests that many survivors of childhood cancer may exhibit long term emotional and psychiatric symptoms. Other researchers have examined the effects of medical interventions on quality of life. Evans (1988) assessed the degree of depression and the quality of life after giving cancer patients antidepressant medications. Results indicated that subjects experienced significant changes in mood and also showed an increase in quality of life as defined by psychosocial adjustment to their cancer. Another stream of research has compared the quality of life of cancer patients to that enjoyed by "controls", eg. non patients. deHaes and VanKnippenberg (1985) found that cancer patients in their study experienced a poorer quality of life compared to non patients. Tait, Duckro, Margolis and Wiener (1988) found in their study of cancer victims that inpatients were more dysfunctional than outpatients in terms of quality of life. Parker, Levinson, Mullooly and Frymark (1989) found that cancer patients with a good prognosis scored higher on a quality of life index compared to persons with a poorer prognosis.

Some research has identified certain factors associated with increasing quality of life for some patients. Karlsson and Andersen (1986) have discussed the many side effects of radiation therapy such as food intolerance, nausea and anorexia. In addition, particularly upsetting times for many patients seem to be the diagnostic period and

the initiation of treatment. These researchers have found that providing patients with information concerning procedures and encouraging patients to ask questions can contribute to a more positive adjustment and quality of life for some individuals. Meyerowitz (1983) attempted to identify factors related to post-mastectomy quality of life. Results indicated that level of cancer specific denial was a significant predictor of adjustment. Those subjects exhibiting high denial tended to also experience low distress. Wallston, Burger, Smith and Baugher (1988) developed a "quality of death" measure for hospice and conventional care subjects to assess the final three days of life, and measuring the degree to which patients experienced the feelings and events that they desired. Results supported the hospice environment, with those patients enjoying a significantly higher quality of death than patients receiving conventional care.

Psychosocial interventions aimed at improving quality of life for cancer patients have often included hypnosis, relaxation training and guided hypnotic imagery as components. The use of calming music has been less common. Each of these is discussed below.

The use of music:

The idea that calming music has therapeutic value is certainly not new. It has long been used in hospital waiting areas, operating rooms and doctor's offices (Cook, 1981). Stoudenmire (1975) compared the effects of music and progressive muscle relaxation on anxious university subjects' state-trait anxiety scores. Results showed that both music and relaxation training significantly reduced state anxiety, although neither reduced trait anxiety. Chetta (1981) investigated the

use of music and information for preoperative pediatric patients. Subjects who were informed about their surgery while simultaneously experiencing the calming effects of music were found to be less anxious than control subjects. Unfortunately, no control group existed to separate the music from information, so it is unclear which technique was beneficial.

Curtis (1986) examined the effects of music on terminally ill patients' perceived degree of pain relief, physical comfort, relaxation and contentment. Results indicated limited support for the effectiveness of music in reducing pain levels. Unfortunately, this research studied only nine subjects. Pfaff, Smith and Gowan (1989) assessed the effects of music assisted relaxation on the distress of pediatric cancer patients undergoing bone marrow aspirations. Subjects' self reports of fear and pain were used with an observational scale as dependent measures. Subjects were asked first to listen to a variety of music selections and then to choose the one that they found most relaxing. The tape was then played during the bone marrow aspiration. Although only six subjects participated in the study, partial support for the use of music in reducing self reports of fear and pain was found.

The use of hypnosis:

Interventions using hypnosis can provide substantial benefits to the person suffering from cancer, such as relief of cancer pain without unpleasant side effects. The degree of pain relief can range from moderate control to total analgesia, depending on the technique used, the skill of the therapist and the willingness of the patient to become

involved. Another benefit of hypnosis is that it does not reduce normal functioning and will not negatively affect the patient's mental capacities, nor will the person develop tolerance to its effects (Barber & Gitelson, 1980). Hypnosis can be learned by a physician, psychologist or nursing staff and can be taught to the patient as a skill that can be used at any time. Hypnosis can be used to promote life enhancing attitudes in the cancer patient. Once he has learned the skill, the patient will see that he or she is able to alter the perception of pain, discomfort and distress. Most importantly, hypnosis presents a skill which the patient can use to focus on personal capabilities and to foster the growth of self esteem. As Barber and Gitelson (1980) write:

Ultimately, the value of hypnosis lies in enabling an individual to potentiate inner capacities for creating psychological quiescence and physical comfort. For a suffering cancer patient, relief that comes from within can provide a much needed experience of personal efficacy and strength (p.36).

The therapeutic use of hypnosis to relieve cancer pain is by no means recent. Cangello, for instance, in 1961, successfully treated cancer patients for pain relief using hypnotherapy and found that 59 percent of patients showed some decrease in narcotic requirements. Further, the need for narcotics was reduced a full 75-100 percent in 36 percent of the cases. More recently, Barber and Gitelson (1980) have outlined the various hypnotic techniques that can be used in the management of cancer related pain. Analgesia may be suggested to the patient so that he is able to directly block awareness of the pain.

Substitution of another feeling (such as pressure or vibration) for the pain can allow the patient to better tolerate a sensation. Moving the perception of pain to a smaller or less vulnerable area of the body is another technique. Finally, in rare instances, the patient may be taught to disassociate his or her perception of awareness from his or her body. Barber (1978) points out that hypnotic pain control can allow the patient to sleep better and to be more alert in the final days because narcotic medication is often not required. This can allow the patient to be more conscious and to spend quality time with family. More recent studies support the use of hypnosis for relief of cancer related symptoms (Kaye, 1987). LaClave and Blix (1989) taught hypnosis to a six year old patient and found it successful in decreasing pain and improving sleep patterns. Similarly, Wall and Womack (1989) used hypnosis to reduce pain for children undergoing bone marrow aspirations and lumbar punctures.

Relaxation training:

In addition to pain relief, hypnosis has been used in conjunction with relaxation therapy and guided imagery to control the aversive side effects of chemotherapy treatment. According to recent literature, nausea and vomiting are being increasingly recognized as factors limiting completion of chemotherapy in patients with cancer (Morrow & Morrell, 1982). Medication for side effects has had only limited success. Alternate forms of treatment, then, have been a welcome addition. The development of anticipatory nausea and vomiting in the cancer patient is gradual, usually appearing sometime after the fourth or fifth chemotherapy treatment, and escalating in severity during

subsequent treatments (Redd & Andrykowski, 1982). The person who suffers from anticipatory distress will typically experience nausea or vomiting the night before the treatment, on the way to the clinic or while waiting for the treatment to begin. The reactions can be understood in terms of respondent conditioning. Through repeated associations with chemotherapy and its aversive side effects, previously neutral stimuli may acquire nausea eliciting properties for some patients (Redd & Andrykowski, 1982). Some patients actually report feeling nauseated while just thinking about chemotherapy. It would seem that a patient's thoughts may play some part in the complex cycle of reactions to this form of treatment and that interventions, then, should address these negative thoughts and feelings. Redd and Andrykowski (1982) employed therapist-directed muscle relaxation hypnosis used with guided imagery to control anticipatory nausea. The intervention was used prior to and during chemotherapy injections. Decreases in nausea prior to and during chemotherapy were reported by all patients whenever this strategy was used.

Lyles, Burish, Krozely and Oldham (1982) studied the efficacy of relaxation training and guided imagery in reducing the aversiveness of cancer chemotherapy. Subjects received either relaxation training plus guided imagery, support and encouragement from a therapist or no special treatment intervention beyond the normal chemotherapy procedures. Results indicated that subjects in the relaxation therapy showed improvement on a variety of measures such as self reports of distress, and observational ratings of nurses of vomiting and

physiological arousal that the control group did not demonstrate. The results suggest that improvement was not due to nonspecific factors, but to the relaxation therapy and guided imagery training. The authors of this study conclude that this form of intervention helps the patient relax and thereby reduces muscle tension, reducing anxiety and side effects of anxiety such as an upset stomach. Further, relaxation and imagery serve as cognitive distractions. The patient is taught to focus on pleasant thoughts and feelings, rather than the sight and smell of the drugs. Many patients in this study reported that their use of relaxation and the changes in nausea that resulted had decreased their feelings of helplessness and had allowed them to feel that they again had some control over their illness. That is, the most important benefit of the treatment intervention may have been the "spin-offs" - the increased sense of control, rather than simply the reduction of nausea. It is precisely this issue which the present study will attempt to address.

Progressive relaxation training involves the contraction and release of major muscle groups in the body (Jacobson, 1968). It is used primarily for persons with high tension levels (Bernstein & Borkovec, 1973). As already described, many cancer patients suffer from tension and anxiety which may be related to chemotherapy treatments or to other problems such as insomnia, fear of death, coping with the illness, etc. Teaching relaxation to cancer patients requires minimal training and it can be learned in a short period of time. It is cost efficient and can be conveniently and easily practiced in daily life (Dolan, Allen & Sawyer, 1982).

Insomnia is a common concern to many cancer patients. It causes fatigue, irritability and stress that exacerbate an already deteriorating condition. Cannici, Malcolm and Peek (1983) trained fifteen cancer patients suffering from insomnia to use muscle relaxation, which involved focusing on 16 muscle groups in the body. Treatment also included indirect suggestions of relaxation. Results indicated that subject's self-reports of insomnia were significantly improved at the end of treatment. Mean sleep onset latency was reduced from 124 to 29 minutes and this improvement remained constant at three months follow up.

Hamberger (1982) studied relaxation as an active coping skill for the control of stress and pain in a cancer patient. The patient was taught to use their feelings of tension as cues to begin relaxing and to use the skill as a coping response to specific imagined stressful situations. The therapist provided the patient with written instructions in the use of active coping relaxation as well as taped relaxation instructions. Results showed that the intervention was effective in reducing debilitating gastric attacks during the first month of training. Fleming (1985) found that 36 of 58 patients with far advanced cancer referred for relaxation therapy were able to obtain relaxation, and reported greater tranquility and decreased pain. Eventually, patients were able to re-establish a state of relaxation independent of the therapist.

Above all, these forms of psychological intervention allow the patients to actively participate in treatment. Perhaps it is this very component - the sense of active participation and personal control -

which is the most impressive benefit of all these interventions. What the person thinks, feels and experiences is vitally important for the success of any program. The power of belief is undoubtedly a factor for healing. The concept of "placebo" demonstrates the extent to which an individual's thinking can impact upon physiological processes. Medical practitioners have long realized the dramatic effects of expectancies on a patient's recovery. As Jospe (1978) points out, primitive treatments may have been unscientific, sometimes dangerous and even for the most part, ineffective. Nevertheless, physicians continued to be respected members of society. The treatments administered may have been bizarre, but they often produced remarkable results because of the patient's unwaivering belief in their potency. How can this phenomenon be explained? No one completely understands the mechanism which underlies the placebo effect, but it does seem clear that the important factor is the patient's faith in the treatment. Spiro (1986) suggests that the explanation for the potency of faith healing by religious groups may be found in the faith of the people, and not in some unknown mystical force. The placebo continues to be an important factor in medicine and psychology today.

Just as the placebo effect can positively influence a person's health and well being, negative thoughts and feelings, whether rationally based or not, can plunge an individual into states of hopelessness and despair. For the cancer patient, such demoralization may in fact jeopardize the success of all medical intervention. Martin Seligman (1975) has extensively studied the states of hopelessness and helplessness as causes of maladies such as depression and withdrawal.

Seligman defines helplessness as a "psychological state that frequently results when events are uncontrollable." (p.9) Seligman theorized that uncontrollable events (such as inescapable shock) can disrupt motivation such that an animal which has learned that its actions are ineffective, will discontinue its efforts to control its environment. Similarly, studies with people show that learned helplessness may interfere with the ability to learn that responding can in fact work. Once an individual has an experience with uncontrollability, he or she may have difficulty learning that a response has succeeded, even when it is actually successful. Fear and frustration are eventually replaced by feelings of anxiety and depression (Seligman, 1975). More recent work in this area has focused on the explanatory styles of individuals, or how people explain the causes of events in their lives. Research suggests that pessimistic styles can predict a negative outcome, resulting in perhaps depression or poor health. Studies have measured the consequences of negative explanatory styles by observing the symptoms of learned helplessness such as passive responding and depression. If individuals attribute the cause of negative events to internal or stable factors, then their style is likely to be pessimistic or depressive (Zullow, Oettingen, Peterson & Seligman, 1988). These same feelings are of course common and natural in the experience of individuals struggling with cancer, and helping them deal with anxiety and frustration is an important component of all treatment, particularly if we want to maximize participation in treatment and minimize demoralization and "giving up."

Guided Imagery

The use of guided hypnotic imagery has also been another successful intervention for oncology patients. Achterberg (1985) states that imagery plays a role in all medical treatments, even though it may be covert. He writes:

The image is an ever present variable in all matters of health. It may not be acknowledged, or manipulated, or used in any systematic way in treatment or diagnosis, but it is there nevertheless, as a critical determinant of health. Imagery is not only a natural concomitant to all healing, but is involved in every interaction health care professionals have with their patients. (p.76)

Araoz (1983) states that positive mental imagery helps the patient to detach themselves from the constant obsession with cancer. Images also help to foster important, goal-directed possibilities and productive futures. Through using imagery, patients can learn to have more positive thoughts and can emphasize positive aspects of their current situation. The Newton Centre of Clinical Hypnosis has been training cancer patients in visualization techniques since 1975. Images of powerful healing forces are used to help the patient experience satisfaction in achieving short and long term goals. The main goal of the program is to improve quality of life for the cancer patient. Newton (1983) reports that use of hypnotic imagery has been helpful in increasing patients' sense of self control, as measured by a locus of control inventory.

Perhaps best known is the controversial work of Simonton,

Matthews-Simonton and Creighton (1978), who used imaging techniques with cancer patients as an adjunct to standard medical treatment. From their longitudinal work, they have observed that those cancer patients who live longer seem to feel that they have exerted some influence over the course of their disease. The Simontons argue for the use of positive beliefs as part of the medical approach :

In this view, physical treatment remains an integral and essential part of the battle with a life threatening disease such as cancer. Yet without beliefs - those of the patient and of the medical team - to support the treatment and create an expectancy of health, the physical treatment is incomplete. Recovery is more likely when we mobilize the whole person in the direction of health. (p.32)

Mental imagery can create positive changes in expectancy. As the placebo concept has demonstrated, an individual's thoughts can greatly influence physical well being. Positive expectancies of comfort or even treatment success can have an impact on outcome. For many cancer patients, the body has become the enemy. It has turned against them by deteriorating, becoming painful and preventing a previously enjoyed quality of life. Positive mental imagery can help the person to relax and to realize that he or she may have control over some aspects of recovery, such as the reduction of pain and discomfort. The day to day routine of the patient may be filled with negativism. That is, painful and distressing treatment procedures may add to an already grim feeling of helplessness. The uncertainty of the future, coupled

with strained family interactions may drag the person down into a state of seeming hopelessness from which escape appears impossible. If however, the patient can learn to recall earlier times when feelings of mastery and competence were experienced, he or she may be able to again learn how to apply these resources to the current situation.

From the years 1974-1978, Simonton and colleagues taught one hundred and fifty nine cancer patients diagnosed as terminal and with a life expectancy of approximately twelve months, to relax and to use their minds to alter the course of their malignancies. Subjects were taught to visualize their white blood cells attacking and destroying "weak" "confused" cancer cells like "strong" "powerful" sharks attacking meat. The results as reported by Simonton were remarkable. Sixty three subjects were alive two years after diagnosis. Of these sixty three, 22 percent showed no evidence of cancer, 19 percent showed tumor regression, and 27 percent had stabilized. In addition to living longer, patients reported a better quality of life than those not participating in the method. Quality of life was defined by Simonton as the level of daily activity maintained during and after treatment compared to the level of activity prior to diagnosis. Unfortunately, Simonton did not include a matched control group of subjects which would have given the findings greater credibility.

Studies have shown that psychosocial interventions for the cancer patient can have a positive impact on daily living and sense of control. For example, Margolis (1983) successfully used hypnosis and peaceful visual imagery with terminal cancer patients and found not only that family life was enriched, but also that the patient was able to come to

terms with fate and to relax more and felt more confident as death approached. Miller (1980) also used hypnosis for a young boy with leukemia who expressed a fear of dying and experienced severe nightmares. Hypnotic intervention eliminated the nightmares, improved behaviour and elicited greater cooperation with treatment. Similarly, Gardner (1976) used hypnotherapy to improve the quality of life for an eleven year old boy suffering from cancer. Hypnosis both enabled the boy to achieve physical relaxation and eliminated his nausea and vomiting. Most importantly, a sense of control was re-experienced. Pain decreased, and a lessening of anxiety occurred when the child was taught to recall earlier feelings of mastery and shown how to bring these feelings into the present. As well, the patient demonstrated a continuing capacity for confidence, humour and self esteem. By reducing the amount of narcotic medication needed, hypnosis allowed him a chance to relate to his family and enjoy time with them during periods of alertness.

Unfortunately, much of the research involving psychological intervention for the cancer patient has consisted of either anecdotal reports lacking any statistical methodology, case studies, or treatment groups with very small numbers of subjects. This research, while certainly interesting and clinically valuable, does not provide well controlled examples of the efficacy of psychological intervention. Ideally, studies would include both a treatment and a control group, as well as a "waiting list" no treatment control. This type of design, however, requires much larger numbers of participants, something that many studies are typically lacking. Lack of co operation from medical

personnel and attrition of subjects contribute to smaller sample sizes. In addition, the medical status of subjects such as type of cancer and the nature of treatment may be variables that are difficult to control for in larger sample sizes.

Psychoneuroimmunology :

Psychoneuroimmunology is a field of study that attempts to establish a relationship between immune functioning and psychosocial influences. There does seem to be some tentative preliminary evidence that the immune system's functioning can be weakened by prolonged or severe stress, particularly when such stress culminates in "giving up", and that psychological interventions (such as relaxation training) can actually enhance immune competence. When our immune responses are operating normally, foreign substances such as neoplasms are detected and destroyed before they become a cancerous tumor. If this system is not operating properly, due to various physical and psychological conditions, cancer cells may escape detection and grow into significant tumors (Hall, 1982). In light of this theory it is important, then, to understand how psychological factors such as stress may affect the immune system and how psychological interventions may enhance immune functioning.

Palmbad and colleagues (1976) subjected people to sleep deprivation and loud noise during a 77 hour continuous attention task. Blood samples were obtained prior to, during and after the task. Significant changes in immune functioning were observed. While interferon production was increased during the task and after the task, phagocytosis decreased during the task but later rose to above baseline

levels after the task. Thus, it simply is not true that stress always results in decreased immune function. The results demonstrate the complicated role which timing and duration of stressful events play in determining the nature of immune changes (Locke, 1982).

Sachar, Fishman and Mason (1965) found that plasma 17 - hydroxycorticosteroid concentration was observed to drop to unusually low levels in subjects who had experienced 90 minutes of deep, relaxing hypnotic trance. Thus, hypnosis may be one way of removing the suppressive effects of adrenal corticoid hormone (Hall, 1982).

Bartrop (1977) measured lymphoblast changes in 33 pairs of bereaved spouses and age-sex-race matched controls. They found that blast transformation was depressed among bereaved spouses at eight weeks after the loss of a spouse, but not at two weeks, in comparison to the non bereaved controls. The results suggest that there is a relationship between length of the bereaved state and impairment in cellular immunity.

Locke and colleagues (1984) investigated the relationship of life change stress and coping to immune function. Self reports of life change stress, psychiatric symptoms and personality measures were collected. Good coping ability was defined as the reporting of few psychiatric symptoms while under considerable stress. Immunologic assessment included natural killer cell activity (it is thought that natural killer cells have an important role in the prevention and spread of tumors), a type of cell-mediated cytotoxicity and antibody titers. A significant relationship was found between psychosocial factors and immunological measures. Those subjects who tolerated stress poorly

had significantly diminished natural killer cell activity when compared to the good copers. As well, psychopathological traits as measured by the MMPI were associated with diminished natural killer cell activity.

Kiecolt-Glaser (1985) reasoned that interventions which lead to reduced distress and loneliness might also lead to an enhancement of immunocompetence. Geriatric residents of independent-living facilities were assigned to relaxation training, social contact or to no contact groups. Natural killer cell activity, antibody titers to herpes simplex virus and lymphocyte response to mitogen stimulation were measured. It was found that the relaxation intervention was associated with significant changes in both natural killer cell activity and herpes simplex virus antibody titers. Kiecolt-Glaser suggests, that regular, long term practice of relaxation techniques may provide important immunological benefits.

These studies provide further evidence that the immune system may be enhanced and strengthened through psychosocial interventions such as relaxation therapy, thereby contributing to the patient's capacity to benefit from treatment and find greater satisfaction in daily living.

The present study

This study explores, in a small group of cancer patients at the Thunder Bay Regional Cancer Centre, whether a brief psychological intervention aimed at gaining the active participation of the patient in learning skills which reduce anxiety and other discomforts, would also contribute to enhanced quality of daily living, reduced worry, and greater feelings of personal control over health, as well as reduced

feelings that external forces are factors controlling health. Therefore, we assessed the degree to which the patient was able to continue in his or her everyday activities, involvement and satisfaction in leisure and vocational activities and relationships with family and friends (Quality of Life), as well as the patient's level of anxiety and beliefs and attributions regarding the control of their own health (self verses powerful others or chance). Measures taken at the beginning of chemotherapy when psychological intervention began, and measures taken at the completion of treatment, were used to determine whether this form of intervention had the predicted effects.

Specifically, the expectations were:

1. Subjects receiving training in relaxation and guided imagery techniques (experimental condition) will indicate lower levels of anxiety, as measured by the State-Trait Anxiety Inventory (see method) than subjects in a placebo/control group.
2. Subjects in the experimental condition will report greater increases of feelings of control, as measured by the Multidimensional Health Locus of Control Scales (see method) than control subjects.
3. Subjects in the experimental condition will report an improvement in the quality of life, greater than that reported by the control group, as measured by the Functional Living Index for Cancer (see method).

Method

Subjects

Subjects were recruited on a strictly voluntary basis from the Thunder Bay Regional Cancer Centre and were undergoing chemotherapy treatments at the centre. The majority of patients were about to begin their chemotherapy, or had undergone one treatment at the time of their referral to our study. Participants were asked to sign a research consent form (see Appendix A).

Two oncologists at the centre were asked to refer all patients who were about to begin their chemotherapy treatment. At the commencement of the study, it had been expected that the number of physician referred patients would total approximately forty persons over a four month period. Unfortunately, referrals did not accumulate as expected and we were left with a much smaller number than we had hoped, even though the study remained open for eight months.

Subjects were randomly assigned to one of two experimental conditions. Random assignment of subjects to condition involved choosing pieces of paper from a box. Half of the pieces of paper had a "one" written on them and half had a "two." In this way, subjects had an equal chance of being assigned to either group.

Group one (N=10) received relaxation and guided imagery training. Subjects were trained in these techniques when they came to the centre for their first, or second chemotherapy treatment. Prior to this, each subject was given a brief outline of the nature and purposes of this study, as well as their proposed contribution. This included a

description of the research as a study of the benefits of relaxation and mental preparation on their experience of treatment and recovery. All subjects in this condition were taken to a quiet room approximately thirty to forty minutes before their chemotherapy was scheduled to begin. While there, they were trained to relax and to mentally prepare themselves for treatment. Subjects were then provided with a cassette tape and tape player with earphones that they took with them to listen to while the chemotherapy session was taking place. The tape contained the same type of relaxation/imagery instructions that the subject received with the therapist prior to the chemotherapy, and the subject was then able to listen to the tape as much as he or she wished during chemotherapy treatment, taking the tape home for daily use (See Appendix B). The experimenter (M.A. Candidate) prepared the imagery script with the assistance of the supervisor, a registered psychologist. In addition to practicum experience at the Thunder Bay Regional Cancer Centre, the experimenter had received training for induction techniques in a counselling course that was part of the requirements for the M.A. program. All subjects were encouraged strongly to practice the exercise each day, by listening to the tape. The researcher did not, however, record the number of patients who listened to the tape daily, as subjects did not want to keep track of the actual amount of time spent listening to the tape.

Subjects assigned to group two (N=9) were accompanied by the therapist to the same quiet room thirty to forty minutes before their scheduled chemotherapy session. They were informed, like the imagery group subjects, that they were part of a study of the effects of

relaxation and mental preparation, and that previous research has shown that some people report beneficial effects in their daily lives. Each subject in this group was given a cassette tape of relaxing music and the same small tape player with earphones (see Appendix C). They were told to relax in preparation for their chemotherapy as they listened to the music. These subjects were also encouraged to listen to the tape each day. Some subjects reported that they disliked the music, and instead substituted a selection from their personal collection of music. This control group received the same amount of therapist attention and spent the same amount of time quietly sitting and listening to an audio tape.

Procedure

Subjects in both groups were administered several pre and post measures, consisting of the State-Trait Anxiety Inventory (Spielberger, 1983), the Multidimensional Health Locus of Control Scales (Wallston & Wallston, 1978) and the Functional Living Index for Cancer (Schipper, Clinch, McMurray & Levitt, 1984). The State-Trait Anxiety Inventory is an effective measure for assessing subject's subjective feelings of apprehension and anxiety. Based on previous research with cancer patients, anxiety prior to chemotherapy is a concern for many individuals. The Multidimensional Health Locus of Control Scales were used to assess the subject's locus of control. This becomes important when we want to assess a person's feeling of control about events in their life. The Functional Living Index for Cancer is a good measure of overall quality of life and reflects any changes due to our treatment intervention (see Appendix D). All subjects were rated by their

oncologist using the ECOG (Eastern Co operative Oncology Group) scale, a measure that is widely used to assess the patient's level of physical functioning (see Appendix E). The physician assigns a number from zero to four, with lower numbers indicating a higher level of functioning. In addition, physicians also rated each subject on the intensity of the chemotherapy regime, ranging from mild or moderate to severe. Mild regimes typically produce less side effects, while severe treatments tend to be more debilitating. The ratings were done independently by each physician and inter-rater reliability was not established. At the end of the study all subjects were sent a short questionnaire, designed to obtain feedback about the subject's role (see Appendix M).

Measures

The State-Trait Anxiety Inventory (STAI) is a self report measure of anxiety that has been used extensively in research and clinical practice. Two measures are obtained. The state anxiety scale consists of twenty statements that evaluate how respondents feel "right now, at this moment." The trait anxiety scale consists of twenty statements that assess how people generally feel. The STAI scales are printed on opposite sides of a single page test form. Scores on the state anxiety scale increase in response to psychological stress and decrease as a result of relaxation training. Reliability of the test has proven to be relatively high. Alpha coefficients for all but one of the state items were above .90 for a sample of working adults, students and military recruits, with a median coefficient of .93. The alpha coefficients for the trait scale were also high, with a median coefficient of .90.

Studies have also been done to assess the validity of the STAI. For example, evidence of construct validity was found in a study of military recruits tested shortly after they began highly stressful training programs. Their scores were much higher than those of college and high school students of comparable age who were tested under relatively nonstressful conditions.

The Multidimensional Health Locus of Control (MHLC) scales are designed to assess an individual's locus of control regarding health matters (Wallston & Wallston, 1978). The scales include three indicators. The first measures internal health locus of control. Statements such as "If I get sick, it is my own behaviour which determines how soon I get well again" are answered by the subject. The powerful others health locus of control section measures the extent to which the individual sees outside forces as being responsible for health. The chance health locus of control section assesses the extent to which the individual believes that luck is responsible for health matters. Correlations of the MHLC scales with health status have provided some evidence of predictive validity. Alpha reliabilities for the MHLC scales have ranged from .673 to .767 (Wallston & Wallston, 1978).

The Functional Living Index - Cancer (FLIC) is a 22 item questionnaire that measures the quality of life in cancer patients. It was developed in Canada using groups of cancer patients with many different types of cancer at different stages. The scale was validated using 837 patients over a three year period. In factor analysing the questionnaire, construct validity was established (Schipper, Clinch,

McMurray & Levitt, 1984). Correlations between the FLIC and other similar measures (eg. General Health questionnaire) yield significant concurrent validity, suggesting that the FLIC may be used as a measure of quality of life and as a screening tool for the identification of specific dysfunction. There are no studies at the present time to evaluate the FLIC's performance in longitudinal research (Schipper & Levitt, 1985). Content of the scale utilizes a seven point Likert format. The items include physical well being and ability, emotional state, sociability and family situation (Schipper, Clinch, McMurray & Levitt, 1984).

Results

Demographic data

The subject pool consisted of nineteen patients who were about to commence, or who had just started chemotherapy. Thirteen women and six men with a mean age of 49 years, were randomly assigned to either the experimental or the control group. The diagnoses of the subjects can be found in Appendix F.

Data analysis

Various analyses were carried out on the data. These included obtaining means and standard deviations for all of the dependent measures for both the experimental and control groups. In addition, t-tests were computed to assess the amount of change over time for each group separately, as reflected by the dependent measures. An analysis of covariance (ANCOVA) was also calculated for the FLIC and the STAI, the only two dependent measures which, in fact, reflected a significant change after intervention, to determine if a significant main effect of group was indicated, that is, to determine if imagery was superior to music in reducing anxiety and enhancing quality of life, while partialling out the effects of the covariates, or scores obtained at pre intervention. This was particularly important on the FLIC because of the almost significant difference between the experimental and control groups at pre intervention for quality of life ratings.

MHLC scales

The MHLC scales were treated as three separate scales. The means and standard deviations of scores on the Internal Health Locus of Control Scale (IHLC) are presented in Table 1, for both the imagery and music control groups at pre and post intervention. Also presented in this table is Wallston and Wallston's (1978) normative data, for comparison.

Table 1
Means and standard deviations
Multidimensional Health Locus of Control Scales

	IHLC		PHLC		CHLC	
	Imagery	Music	Imagery	Music	Imagery	Music
Pre	25.10	24.22	24.30	22.77	20.90	19.00
	(5.40)	(5.97)	(7.28)	(4.73)	(6.43)	(4.52)
Post	23.60	26.33	25.20	21.77	21.30	20.22
	(4.57)	(7.19)	(6.12)	(6.41)	(5.43)	(7.10)
Norms	25.10		21.77		15.57	
	(4.89)		(6.41)		(5.75)	

IHLC = Internal Health Locus of Control

PHLC= Powerful Others Health Locus of Control

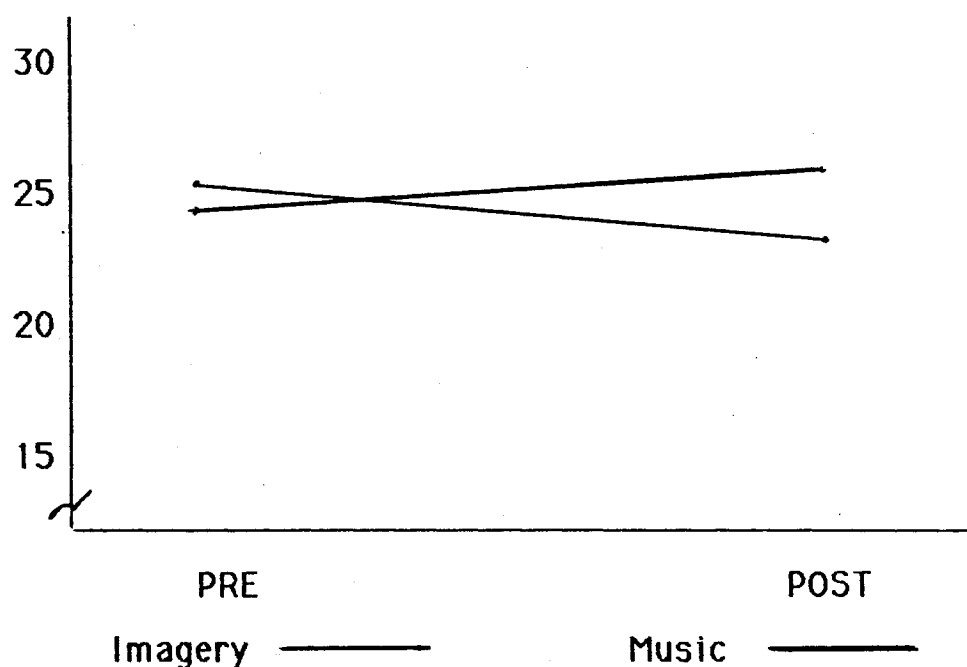
CHLC= Chance Health Locus of Control

It can be noted that the mean scores for this sample of cancer patients on IHLC are within the normal range. A t-test to determine whether the scores on IHLC at pre intervention were roughly the same for both the imagery and the music group, that is, to determine whether our randomization procedure had produced two similar groups, revealed a nonsignificant difference between the two groups $t(17) = .33, p = .74$.

Figure 1 depicts the mean scores on IHLC at pre intervention and post intervention for both the imagery group and the music group.

Figure 1

Mean scores for Internal Health Locus of Control



It can be noted that the mean internal score for the patients receiving imagery was 25.10 at pre testing and 23.60 after imagery training. A

t-test of this difference indicated that it was not statistically significant $t(9) = .85, p = .42$. Also depicted in Figure 1 is the music group subjects' mean scores on IHLC of 24.22 at pre intervention and 26.33 after intervention. A t-test of this difference again revealed a nonsignificant change over time $t(8) = -1.51, p = .17$.

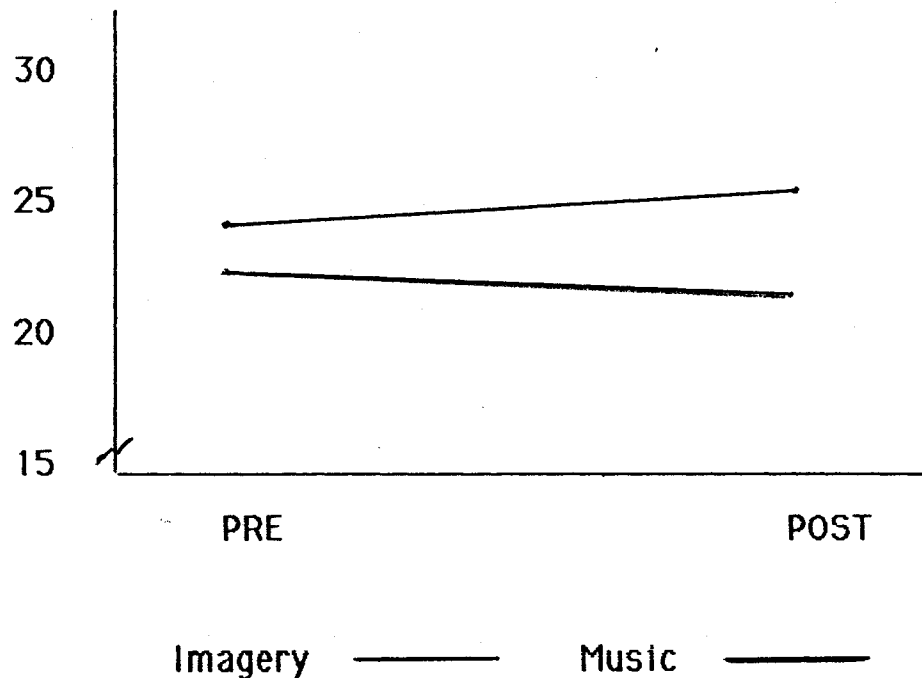
The means and standard deviations of scores on the Powerful Others Health Locus of Control Scale (PHLC) are presented in Table 1 for both groups at pre and post intervention. Also presented in this table is Wallston and Wallston's (1978) normative data, for comparison. It can be noted that the mean score for the imagery group subjects is significantly higher than the normative mean at both pre ($z = 3.59, p < .01$) and post intervention ($z = 4.34, p < .01$), indicating that our subjects tended to express greater than average attributions of control over their health to powerful others. The mean score on PHLC for subjects in the music group at pre intervention is significantly higher than the normative mean ($z = 2.32, p < .05$), and is almost significantly higher at post intervention ($z = 1.48, p = .06$). A t-test to determine whether the scores on PHLC at pre intervention were roughly the same for both the imagery and music groups revealed a nonsignificant difference between the two groups $t(17) = .62, p = .54$.

Figure 2 depicts the change in scores on PHLC from pre intervention to post intervention for both the imagery group and the music group. A t-test of the difference between the mean scores on PHLC at pre and post testing (24.30 and 25.20, respectively) for the imagery group, revealed a nonsignificant difference $t(9) = -.55, p = .59$.

Also depicted in Figure 2 is the music group subjects' mean scores on

PHLC of 22.77 at pre intervention and 21.77 post intervention. A t-test revealed a non significant change over time $t(8) = .52, p = .62$.

Figure 2
Mean scores for Powerful Others Health Locus of Control



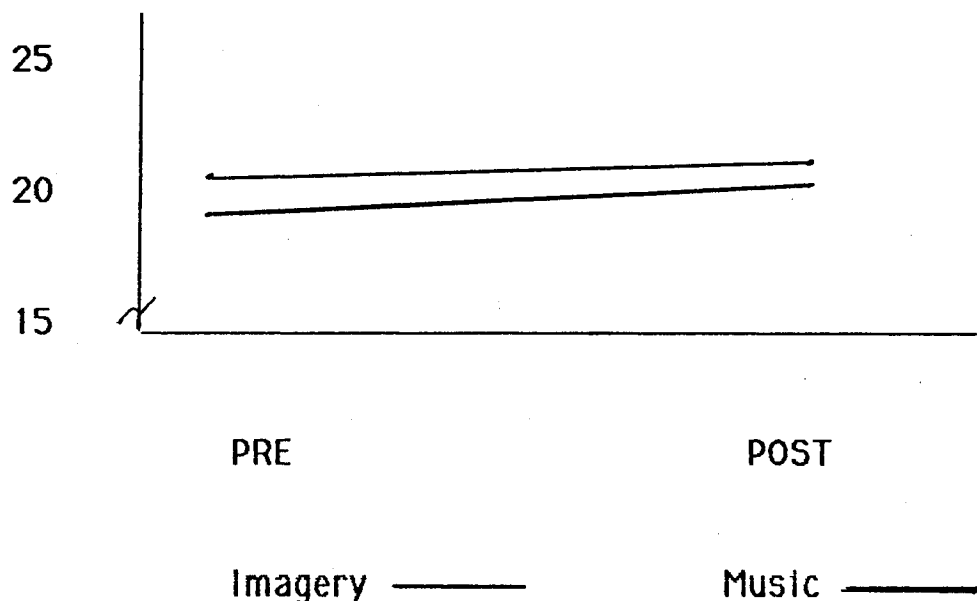
The means and standard deviations of scores on the Chance Health Locus of Control Scale (CHLC) are presented in Table 1, as is the normative data. It can be noted that the mean scores at pre intervention are significantly higher than the normative mean for both the imagery ($z = 4.04, p < .01$) and music groups ($z = 2.60, p < .01$), indicating that our subjects tended to express greater than average attributions of control over their health to chance factors. After intervention, mean scores are still significantly higher than the normative data for the imagery group ($z = 4.34, p < .01$) and for the

music group ($z = 3.52, p < .01$). A t-test to determine whether the scores on CHLC at pre intervention were roughly the same for both the imagery and the music group revealed a non significant difference between the two groups $t(17) = .66, p = .52$.

Figure 3 depicts the mean scores on CHLC at pre intervention and post intervention for both the imagery group and the music group.

Figure 3

Mean scores for Chance Health Locus of Control



The mean scores for subjects trained in imagery were 20.90 at pre testing and 21.30 after intervention. A t-test of this difference indicated, however, that this change was not significant $t(9) = -.24, p = .82$. Also depicted in Figure 3 is the music group subjects' mean scores on CHLC of 19.00 at pre intervention and 20.22 after intervention. A

t-test of this difference again revealed a nonsignificant change over time $t(8) = -.58, p = .58$.

State anxiety

The means and standard deviations of scores on the State Anxiety Inventory (SAI) are presented in Table 2 for both the imagery and music groups at pre intervention and at post intervention. Also presented in this table is Spielberger's (1983) normative data, for comparison.

Table 2
Means and standard deviations
STAI and FLIC

	SAI		TAI		FLIC	
	<u>Imagery</u>	<u>Music</u>	<u>Imagery</u>	<u>Music</u>	<u>Imagery</u>	<u>Music</u>
Pre	49.50 (17.21)	44.33 (11.20)	41.20 (12.43)	38.77 (10.14)	98.80 (22.91)	113.56 (24.21)
Post	38.60 (10.02)	34.22 (10.12)	37.90 (11.12)	32.44 (8.38)	103.40 (17.75)	129.89 (16.53)
Norms	<u>Males:</u> 35.72(10.40)		34.89(9.19)			
	<u>Females:</u> 35.20(10.61)		34.79(9.22)			

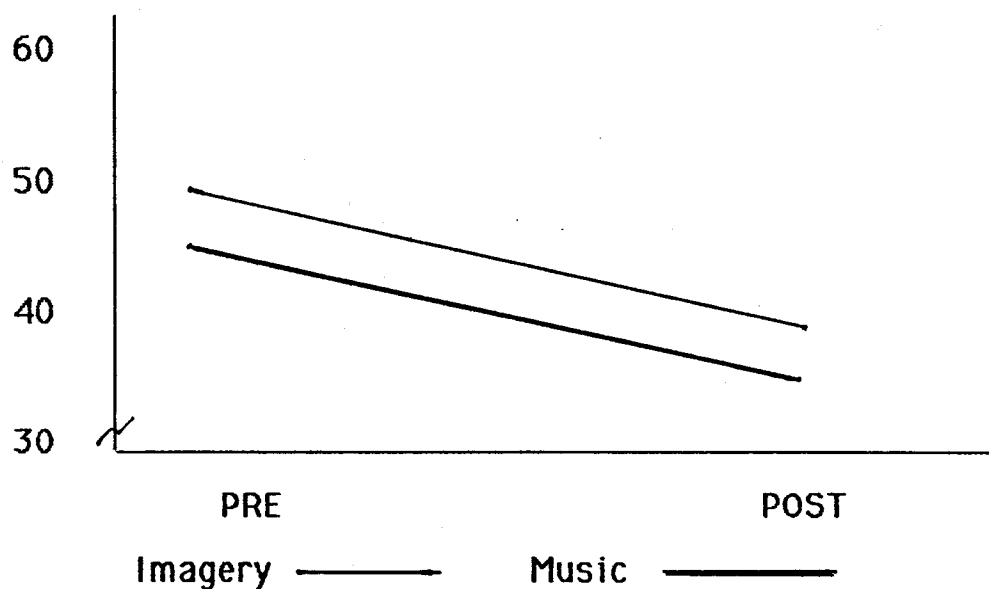
SAI = State Anxiety Inventory, TAI = Trait Anxiety Inventory

FLIC = Functional Living Index for Cancer

It can be noted that mean pre intervention scores for this sample of cancer patients are higher than normative data, indicating that subjects tended to express greater than average anxiety levels. A t-test to determine whether the scores on state anxiety at pre intervention were roughly the same for both the imagery and the music group revealed a nonsignificant difference between the two groups $t(17) = .78, p = .45$.

Figure 4 depicts the change in state anxiety from pre intervention to post intervention.

Figure 4
Mean scores for State Anxiety



It can be noted that the mean state anxiety score for the subjects receiving training in imagery decreased significantly over the course of intervention $t(9) = 2.78, p = .02$ from 49.50 at pre testing to 38.60

after intervention, indicating that subjects reportedly experienced significant decreases in state anxiety over time. Also depicted in Figure 4 is the music group subjects' change in state anxiety from 44.33 before intervention to 34.22 after intervention. A t-test of this change indicates a significant decrease in state anxiety for these subjects also $t(8) = 3.25, p = .01$.

In order to determine whether there was a significant difference between the two groups at post intervention on state anxiety, that is, to determine whether imagery training resulted in significantly more benefit to subjects than listening to music, an ANCOVA was also computed, with the scores obtained at pre intervention as the covariate, and the scores obtained at post intervention as the dependent variable (see Appendix G). Results indicate a non significant difference between the experimental and control groups $F(1, 18) = .314, p = .58$. Thus, while patients in both groups reported significant reductions in state anxiety over the course of intervention, there was no evidence that imagery training was superior to listening to music in accomplishing this reduction.

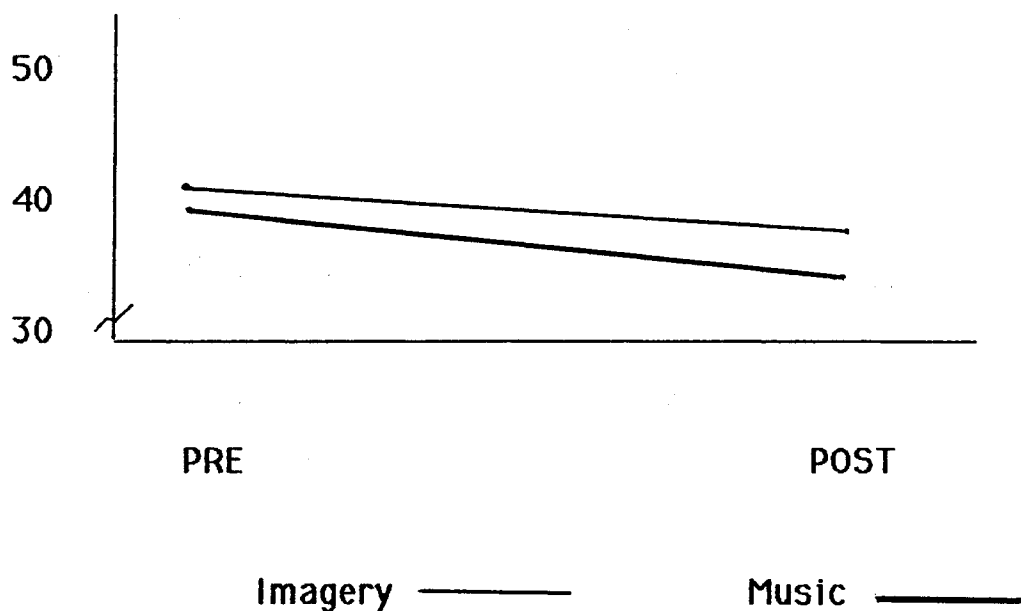
Trait anxiety

The means and standard deviations of scores on the Trait Anxiety Inventory (TAI) are presented in Table 2 for both groups before and after intervention. Also presented is Spielberger's (1983) normative data for comparison. It can be noted that the mean scores for the imagery group subjects are higher than the normative data, indicating that these subjects tended to report greater than average levels of trait anxiety. A t-test to determine if the groups were roughly the

same before intervention revealed a non significant difference between the two groups $t(17) = .47, p = .65$.

Figure 5 depicts the change in scores on trait anxiety from pre intervention to post intervention for both the imagery group and the music group.

Figure 5
Mean scores for Trait Anxiety



It can be noted that the mean trait score for the imagery group subjects appears to decrease over the course of intervention, from 41.20 at pre testing to 37.90 after intervention. A t-test indicated, however, that this change was not statistically significant $t(9) = .84, p = .42$. Also depicted in Figure 5 is the music group subjects' change in trait anxiety from 38.77 at pre intervention to 32.44 after intervention, indicating a significant decrease in trait anxiety levels over the course of intervention $t(8) = 2.60, p = .03$. An ANCOVA was also computed to determine whether there was a significant difference

between the experimental and control groups on trait anxiety at post intervention, while partialling out the scores obtained at pre intervention (see appendix H). The result indicates a non significant difference $F(1,18) = 1.18, p = .29$. Thus, while subjects in the music group did report a significant reduction in trait anxiety after intervention, their scores were still not significantly lower than those of the imagery group subjects.

Quality of life

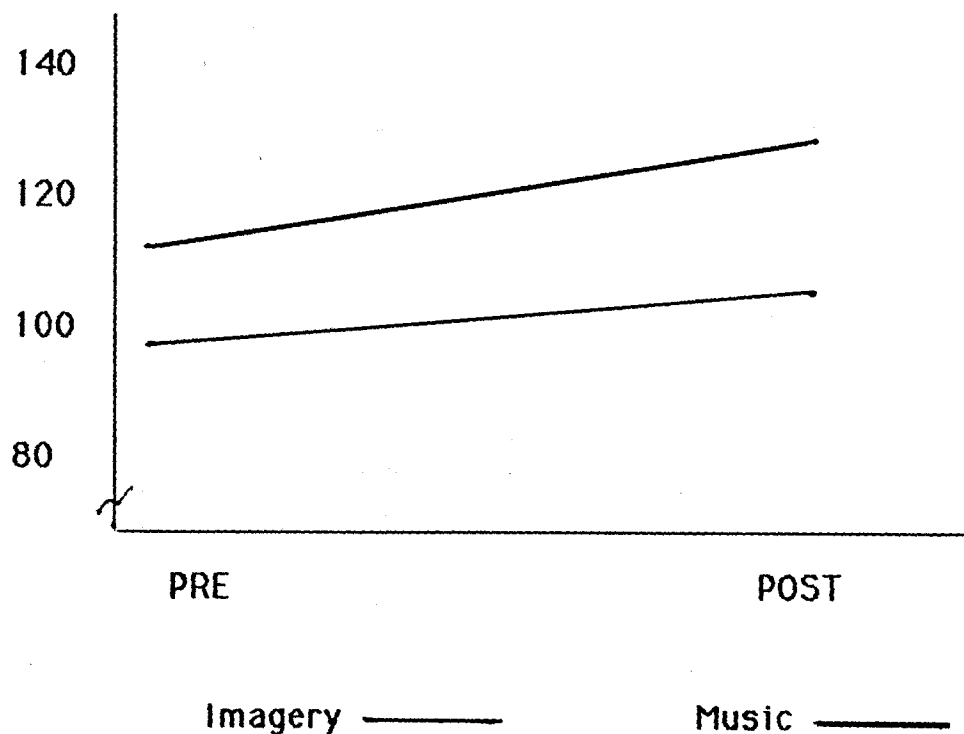
The means and standard deviations of scores on the Quality of Life Measure (FLIC) are presented in Table 2 , for both the imagery and music groups. Schipper, Clinch, McMurray and Levitt (1984) report mean scores ranging from 106 to 143, with some patients tested in a Winnipeg sample and others in Edmonton. It can be noted that the mean score for the imagery group subjects at pre intervention is somewhat low, indicating that subjects in this group tended to report a lower than average satisfaction with daily life. Observation of individual test protocols reveals that certain items tended to be endorsed most frequently by this group. For example, these subjects reported that they felt that their illness had imposed a hardship on themselves, and on those closest to them, and also reported pain, nausea and feeling uncomfortable.

A t-test to determine whether the scores for quality of life at pre intervention were roughly the same for both the imagery and the music group revealed a nonsignificant difference $t(17) = -1.35, p = .20$. Although this finding indicates that the two groups were not statistically different, the resulting probability is approaching

significance, especially for our relatively small sample size. Thus, at pre intervention, it is apparent that the two groups are not completely equivalent in terms of quality of life. The imagery group subjects tend to report a lower quality of life than the music group subjects.

Figure 6 depicts the change in scores for quality of life from pre intervention to post intervention for both groups.

Figure 6
Mean scores for Quality of Life



It can be noted that the mean score for the imagery group subjects increased somewhat over the course of intervention, from 98.80 at pre testing to 103.40 at post intervention. A t-test indicated, however, that this change was not significant $t(9) = -.76, p = .47$. Also depicted

in Figure 6 is the music group subjects' change in quality of life scores from 113.56 pre intervention to 129.89 post intervention, indicating a significant increase in quality of life $t(8) = -4.16, p = .003$.

An ANCOVA was calculated in order to determine whether there was a significant difference between the two groups on quality of life, with the scores obtained at post intervention being the dependent variable, and the scores obtained at pre intervention as the covariate (see Appendix I). Given the fact that the music group subjects reported a somewhat higher quality of life than the imagery group subjects at pre intervention, this particular analysis was considered more appropriate than a simple ANOVA on the post scores. Results show a main effect for group, $F(1,18) = 10.02, p = .006$, indicating a significant difference on the FLIC between our groups, with the control group subjects reporting a significantly better quality of life than the imagery group subjects at post intervention. On this one measure (FLIC), the subjects in the control group appeared to benefit more than subjects in the imagery group. However, before concluding on the basis of this that listening to music was superior to imagery training in enhancing quality of life, it is important to acknowledge that subjects in the control group were, unfortunately, also higher functioning, or less debilitated, than the imagery group subjects.

ECOG rating

A physician rated each subject on the ECOG scale, assigning a number from 0 to 4 to indicate the level of functioning of the subject, with lower numbers meaning a high level of functioning, and greater numbers indicating a more disabled individual. The mean ECOG rating

for subjects in the imagery group and the music group is presented below.

Table 3
Mean scores for ECOG rating
and chemotherapy intensity

	Imagery	Music
Ecog	1.00	0.11
Chemo Intensity	2.30	1.78

In our sample, the range of scores was from zero to two. A chi square was calculated in order to test for differences in the level of functioning (ECOG ratings) between groups. Results indicate that the groups were not equivalent ($\chi^2 = 7.04$, $p = .029$), indicating that by chance the imagery group, in fact, contained more lower functioning subjects than the music group.

Table 4
Distribution of subjects
ECOG rating

	0	1	2	
Imagery	3	4	3	10
Music	8	1	0	9
	11	5	3	

$$\chi^2 = 7.04 \quad p = .029$$

0 - Fully active, able to carry out all predisease activities without restrictions

1 - Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature

2 - Ambulatory and capable of all self care but unable to carry out any work activities. Up and about more than 50% of waking hours

Given the fact that the imagery group contained a significantly greater number of lower functioning subjects than did the music group, and due to the almost significantly different FLIC scores between the two groups at pre intervention, it was thought that the difference between the two groups on quality of life at post intervention might be as much due to the lower physical functioning, or lack of "wellness" of the imagery group subjects, as to the failure of the imagery training

per se.

Perhaps the lower functioning subjects in the music group responded differently than the higher functioning subjects in the music group. Therefore, in order to examine the effects of our two interventions, as well as the effect of level of functioning (ECOG rating) on quality of life, a two way analysis of covariance was calculated with the FLIC scores obtained at post intervention as the dependent variable, while partialling out the FLIC scores obtained at pre intervention (See Appendix J). By calculating a two way ANCOVA, it is also possible to determine if the benefits of treatment group depend upon the level of the other independent variable (eg. level of functioning). We might expect, then, that the effects of our treatment on quality of life depend in part, on the physical functioning of the subject, as measured by the ECOG rating scale. Results indicate a main effect, but it could not be statistically attributed to either treatment group or to ECOG rating. The effect for group approaches significance $F(1, 18) = 3.69, p = .08$. Surprisingly, no main effect is found for ECOG rating $F(1, 18) = 1.22, p = .33$, indicating that the level of functioning of a subject was not a significant influence on quality of life. No interaction effect was found $F(1, 18) = .225, p = .64$, indicating that any effects of our intervention on quality of life did not depend upon the level of functioning of the subject.

Chemotherapy intensity rating

Subjects were classified by their medical oncologist with regard to the intensity of their chemotherapy regime. That is, the physician simply wrote on a piece of paper whether the subject was receiving

mild, moderate or severe intensities of chemotherapy. The researcher then categorized mild as a "1", moderate as a "2" and severe as a "3." The mean chemotherapy intensity score for subjects in the imagery group and in the music group can be found in Table 3. Due to the small sample size, the researcher then collapsed these three categories into two, with mild and moderate chemotherapy intensities categorized as a "1" and severe intensities as a "2." A chi square test for distribution of subjects can be found in Table 5.

Table 5
Distribution of subjects
Chemo intensity

	Mild/Mod.	Severe
Imagery	6	4
Music	8	1
	14	5
		$\chi^2 = 2.04$ p = .153

Results indicate that the groups were not significantly different regarding chemotherapy intensity ($\chi^2 = 2.04$, $p = .153$), although they are in the direction of the imagery group containing patients receiving

more intense chemotherapy.

A two way ANCOVA was calculated in order to examine the effects of our intervention and the effects of the chemotherapy intensity of each subject on quality of life at post intervention, while partialling out the effects of pre intervention scores (see Appendix K). A two way ANCOVA was chosen to determine whether or not the benefits of intervention and the intensity of chemotherapy were simultaneously influencing quality of life. Because of the toxic effects of some treatments, it was expected that, perhaps, more severe chemotherapy regimes might lower a patient's quality of life. In addition, it was expected that the severity of treatment might affect quality of life differently, depending on which treatment group subjects were assigned to. Because subjects in the imagery group tended to be lower functioning, it was expected that this group as a whole, might respond differently to an intense chemotherapy regime (eg. a significantly lower quality of life), as compared to subjects in the music group, who tended to be higher functioning. Results indicated a main effect for both group $F(1, 18) = 7.86, p = .01$, and for chemotherapy intensity rating $F(1, 18) = 5.32, p = .03$. These findings suggest that the music group subjects enjoyed a significantly higher quality of life than did the imagery group subjects at post intervention, and that those subjects receiving more toxic chemotherapy, regardless of which intervention they were assigned to, tended to report a lower quality of life than did subjects undergoing a less toxic treatment. No interaction effect was found $F(1, 18) = .031, p = .86$, indicating that any effects of our intervention on quality of life did not depend upon the intensity of the

chemotherapy regime experienced by the subject.

Correlations

Correlations were calculated for all subjects on the dependent measures taken before intervention (FLIC, STAI, MHLC scales) and for the chemotherapy intensity rating and the ECOG rating.

Table 6
Correlations of measures before intervention

	Flic	State	Trait	Internal	Others	Chance	Ecog
State	-.71**						
Trait	-.63**	.55*					
Internal	.36	-.13	-.20				
Others	-.11	.20	.40+	.35			
Chance	-.24	.02	.38+	-.03	.59**		
Ecog	-.28	-.03	.09	-.10	.38	.41+	
Chemo	-.34	.20	-.07	.17	-.07	-.08	.18

+ P < .10

* P < .05

** P < .01

Several significant results were found. The positive correlation between state and trait anxiety ($r = .55$) is to be expected. The positive correlation between the Chance Health Locus of Control and the Powerful Others Health Locus of Control ($r = .59$) perhaps suggests that those subjects who felt that health matters were largely in the hands of others, were more likely to attribute their health or illness to another "external" force, namely luck, or chance. The inverse

relationship between trait anxiety and quality of life ($r = -.63$) suggests that the greater the propensity to anxiety, the lower the quality of life, or vice versa. Similarly, the state anxiety measure is negatively correlated with the FLIC ($r = -.71$) suggesting a relationship between temporary anxiety states and quality of life. Although not significant at the .05 level, two other correlations at the pre measures are worth mentioning as they do approach significance levels. Trait anxiety positively correlates with Powerful Others Health Locus of Control ($r = .40, p = .09$), suggesting that subjects with a propensity for anxiety are also more likely to report that others are in control of their health, or vice versa. Similarly, trait anxiety is positively correlated with the Chance Health Locus of Control measure ($r = .38, p = .10$), indicating that the more highly anxious subjects also attribute health matters to luck or chance factors, and conversely, that less anxious subjects are less likely to attribute control of their health to external factors.

Though not significant, correlations are in the predicted direction for quality of life and internal locus of control. That is, a strong positive, though not significant correlation for quality of life and Internal Health Locus of Control is observed ($r = .36, p = .13$), indicating that those subjects tending to attribute control of their health to personal actions also tend to enjoy a higher quality of life. Chance Health Locus of Control is correlated with the ECOG rating ($r = .41, p = .08$) indicating that subjects who were rated as lower functioning by their physicians are also likely to attribute their health to a chance factor.

Correlations were also computed for all subjects on the post measures.

Table 7
Correlations of measures after intervention

	Flic	State	Trait	Internal	Others	Chance	Ecog
State	-.54*						
Trait	-.77**	.86**					
Internal	.30	-.31	-.28				
Others	-.26	.02	.13	.37			
Chance	-.05	.05	.15	-.19	.51*		
Ecog	-.58**	.38	.54*	-.39+	.43+	.46*	
Chemo	-.60**	.21	.35	-.30	-.23	-.08	.18

+ $P < .10$

* $P < .05$

** $P < .01$

Once again, state and trait scores are positively correlated ($r = .86$). Similarly, Chance Health Locus of Control scores are still strongly correlated with Powerful Others Health Locus of Control scores ($r = .51$), and trait and state anxiety are again inversely correlated with quality of life scores ($r = -.77$), ($r = -.54$), respectively. Quality of life scores are inversely correlated with the ECOG rating scores ($r = -.58$)

indicating that subjects who have been rated by their physicians as higher functioning also report a higher quality of life. FLIC scores are also inversely correlated with chemotherapy intensity rating scores ($r = -.60$) indicating that subjects receiving a less intense chemotherapy regime also report a higher quality of life. Trait anxiety scores are positively correlated with the ECOG rating scores ($r = .54$) indicating that subjects who have been rated as lower functioning are also more likely to score high on trait anxiety. Chance Health Locus of Control is positively correlated with the ECOG rating ($r = .46$) indicating that lower functioning subjects tended to attribute control of their health to a chance or luck factor. Although not significant at the .05 level, the ECOG rating is positively correlated with the Powerful Others Health Locus of Control scores ($r = .43, p = .07$) indicating that lower functioning subjects tended to attribute their health to powerful others. The ECOG rating is also negatively correlated with the Internal Health Locus of Control ($r = -.39, p < .10$), indicating that higher functioning subjects tended to attribute their health to personal actions.

Multiple Regression Analysis

In order to determine those variables that best predicted subjects' change on quality of life from pre to post intervention, a multiple regression analysis was computed using the change scores on the FLIC as the dependent variable. The scores obtained at pre intervention on the STAI, and the MHLC scales were used as predictor variables, as were the ECOG ratings, the chemotherapy intensity ratings, and the group subjects were assigned to. Results indicate that Internal Health

Locus of Control is the best predictor of subjects' change in quality of life over the course of intervention, regardless of which group subjects were assigned to, $R = .39$, $F(1,17) = 11.08$, $p < .01$ (see Appendix L). That is, those subjects who scored lower on the IHLC scale at pre intervention also tended to experience the greatest increase in quality of life over the course of intervention. Subjects' level of functioning, as measured by the ECOG rating, was also a significant predictor of changes in quality of life, $R = .56$, $F(2,16) = 10.02$, $p < .01$ (see Appendix L). Those subjects who were higher functioning at pre intervention experienced the greatest improvement in quality of life over the course of intervention. Subjects' state anxiety ratings were another significant predictor, $R = .66$, $F(3, 15) = 9.80$, $p < .01$ (see Appendix L). Those subjects experiencing the greatest anxiety at pre intervention experienced the greatest improvement in quality of life. Group assignment was not in itself as good a predictor as these three other variables. In combination, this subset of three variables, IHLC, ECOG rating and State Anxiety, are sufficient for maximal prediction of change in quality of life. Together, these three variables account for 66 percent of the total variance.

Follow-up Questionnaire

Of the nineteen questionnaires sent out to subjects, twelve were returned. Subjects were asked to rate the degree to which the study had been beneficial to them. One subject responded that the study had been not at all beneficial, four subjects responded that it had been slightly beneficial, three subjects replied that the program had been moderately beneficial, and four subjects said that the study had been

very beneficial. When asked how the study had been beneficial, subjects generally replied that the relaxation exercises had helped reduce anxiety and tension and had improved the ability to sleep and focus on positive, rather than negative thoughts about the chemotherapy (see Appendix N).

Discussion

The present study addressed several important questions regarding the efficacy of psychological interventions with cancer patients. Based on previous research which has shown that psychological approaches to the treatment and management of cancer can alleviate some of the distress associated with debilitating side effects of treatment, we reasoned that perhaps, such interventions might also have other, less specific benefits. These include an increased sense of personal control over treatment and recovery, the acquisition of coping techniques such as relaxation and imaging, and most importantly, an influence on the patient's overall quality of life. Our results, although not in the predicted direction of favouring the experimental condition, nonetheless have some implications for future research in this area, and for clinicians working with the cancer patient.

Our study, unlike many others in the current literature, did not include a "no treatment" as a control group. Instead, we included the music group as a placebo control group, one which would provide some expectancy of benefit, but without any of the specific psychological input which went into the imagery group. What we had expected to demonstrate was that the gains to be achieved via a psychological intervention such as imagery training, albeit in this case brief and simple, would be additive to those attributable to relaxation benefits and positive expectancy. We found no evidence to support this expectation, though of course, conclusions based upon such a small sample size must at best be considered tentative. In fact, it has been

our music intervention that has shown a significant improvement as reflected by a measure of quality of life. On this measure, the music group appears to have fared significantly better than the imagery group. We had predicted that subjects assigned to the experimental condition would indicate lower levels of anxiety, report greater increases of feelings of control, and report a better quality of life than those in the control group. We did find support for a reduction in anxiety, but the reduction occurred in both groups without favouring the imagery group. Further, we did not find any significant changes in health locus of control or quality of life for those subjects in the experimental or "imagery" group. Even though the imagery group was composed of more debilitated subjects than the music group, the analysis of variance still did not indicate a main effect for level of functioning on quality of life. Why, then, did the imagery group subjects not experience a significant increase in quality of life scores over the six week intervention? Perhaps these subjects did not benefit greatly from the guided imagery exercise that they were asked to listen to every day. These images may have only reminded the subject of an upsetting ordeal, namely, the chemotherapy routine. This issue is further discussed later.

No significant differences were found on the health locus of control scales within or between our groups. Neither group, in fact, changed at all. As stated earlier, these findings run contrary to our expectation that relaxation and imagery training would, in fact, increase a patient's sense of personal control over feelings of helplessness and despair regarding health matters, and that such an

intervention would be superior to the control. We had reasoned that learning a skill to be practiced at will would increase an internal locus of control and decrease the tendency to make external attributions in regards to one's well being. It is noteworthy that subjects in the imagery group scored significantly higher than the norm on the Powerful Others Health Locus of Control Scale. Even after our intervention, this group still scored above average, indicating that they tended to have a strong belief that their health was controlled by various others, such as doctors and nurses. This belief was not susceptible to alteration by our brief psychological intervention.

As indicated earlier, the imagery group, in fact, contained more lower functioning subjects than the music group. Correlations at post intervention indicate that subjects who had been rated as lower functioning (ECOG) tended to attribute their health to external factors such as powerful others and chance, while higher functioning subjects were more likely to attribute health to their own actions. Perhaps as one becomes increasingly ill and more debilitated, attributions of an external nature increase. It may be "easier" for a fairly well individual to attribute health to personal actions, and not the actions of others, such as professionals or family members. Perhaps, the sicker a person becomes, the more he or she begins to realize that personal attributes or actions are not affecting physical outcome.

The multiple regression analysis indicated that the Internal Locus of Control Scale was a significant predictor of changes in quality of life, regardless of which type of intervention subjects received. Specifically, those subjects who tended to have low attributions of an

internal locus of control before intervention experienced the greatest improvement in quality of life over the course of the intervention. Conversely, subjects who scored high on internal control experienced less improvement in quality of life. Since the subjects who reported higher attributions of an internal locus of control before intervention were already enjoying a slightly higher quality of life, (although not significant for our small sample size) they had less room for improvement in terms of quality of life, as compared to subjects who scored low on IHLC at pre intervention. While this may partially explain the multiple regression results, it is also possible that highly internal individuals, who may already be engaging in their own personally effective strategies for coping with their cancer and maintaining a high quality of life, are less likely to find an intervention like this one useful. On the other hand, the patients who feel less personal control over their health may perhaps grab on to any ideas and techniques suggested to them out of compliance or out of faith in the technology of their doctor or psychologist. These patients, then, are the ones who appeared to benefit the most from their participation in the study, regardless of which group they were assigned to.

Subjects were simply asked to relax by listening to a tape each day in preparation for their chemotherapy treatment and may have felt that the intervention was analogous to any recommendations made by doctors and nurses concerning treatment. Patients who were low on attributions of personal control may have complied more dutifully with the intervention thereby experiencing the greatest increase in quality of life, perhaps because of their faith in the benefit of relaxation

exercises. In addition, those who were low on attributions of personal control may not have considered any type of self-help intervention until invited to participate in the study. Those who were high on this measure may very well have been using similar personal strategies for some time, and further benefit would not be realized by our intervention.

These results suggest that a brief, simple psychological intervention may be appropriate with a group of patients who do not really believe that their own actions can make a difference to their health and who prefer, for whatever reasons to attribute control of their health to external forces. Interestingly, our results indicate that these subjects showed the most change in quality of life, even though there was no corresponding change in their health attributions. That is, they did not suddenly begin attributing their health to their own actions, even though they enjoyed a better quality of life because of them. It is also possible that attributions regarding health control could be a factor in compliance rates, in that persons who attribute control to an external force might be as likely to comply with treatment as an individual having an internal locus of control, if they perceive that it involves little self-initiation and personal responsibility for health.

Both the imagery and music groups indicated a greater than average mean on the chance locus of control measure, prior to, and after intervention. That is, subjects in both groups tended to attribute their well being, or lack of it, to chance factors more than those subjects who were studied for the normative sample on which the

means are based. It should be noted, however, that the normative sample was not comprised of cancer patients undergoing chemotherapy treatments. Perhaps our means are representative of the typical attributions of control made by cancer chemotherapy patients. In addition, our intervention was a simple one, and did not involve counselling or cognitive restructuring. Perhaps relaxation work by itself is not sufficient to encourage changes in an individual's attributional style.

The finding that state anxiety significantly decreased for both groups from pre to post times is consistent with expectations of the effects of relaxation training. We would expect subjects who practice relaxation daily to lower their levels of state anxiety, regardless of how that relaxation state is achieved (eg. via imagery or via listening to music). This finding supports the idea that such a relaxation response can be achieved equally well by many different means. It is a "non specific" physiological response in the sense that many different techniques can be used to achieve the same result. It is interesting, however, that the mean for the trait anxiety measure significantly decreased for the music group only. This finding is unusual in a six week period, as trait anxiety is thought to be a fairly stable personality trait that does not fluctuate significantly over time (Spielberger , 1983). Perhaps cancer patients, unlike the normal population on which norms for the STAI were based, can experience differences in their anxiety levels over relatively short periods of time, and in such instances, the Trait Anxiety Inventory measures something other than stable trait anxiety. Being diagnosed with

cancer, and then undergoing treatment for it, may "recalibrate" one's anxiety levels to a slightly elevated level. The fact that the pre scores on trait anxiety are slightly elevated compared to the norms, tends to suggest this. Perhaps the opportunity to achieve a state of relaxation daily has the potential to restore anxiety levels back to their original point, within more normal limits for patients who are less debilitated. The finding that the experimental group did not experience a significant change in trait anxiety, while the music group did, may be explained by the fact that the former group was comprised of more debilitated subjects, as reflected by their higher ratings on the ECOG scale. Trait anxiety levels may have remained high for imagery group subjects because of the greater severity of illness among this group, and therefore perhaps a reduced responsiveness to such a brief intervention.

Correlations obtained at pre intervention indicate that subjects having a greater propensity to anxiety also report a lower quality of life. Furthermore, those subjects indicating greater anxiety levels also tend to attribute health to external factors, such as chance and powerful others. At post intervention, results show that subjects who were rated as lower functioning were also more likely to score high on trait anxiety. One would expect high anxiety levels to be associated with attributions of an external control as well as lowered quality of life and low functioning abilities. Lower functioning patients are more likely to be truly dependent on others, such as health professionals, thereby justifiably attributing control to them. Also, in turn, it is likely that being more ill is what contributes to higher anxiety levels.

Regarding quality of life, we would not expect a highly anxious individual to enjoy as much satisfaction with life as someone who is comparatively more relaxed. On the other hand, the multiple regression analysis indicated that a subject's level of state anxiety was a significant predictor of changes in quality of life, with more anxious subjects reporting greater increases in quality of life over the time of intervention. This finding suggests that the more highly anxious subjects in our study benefited the most in terms of improvements in their quality of life. Perhaps by gaining a skill via relaxation training, subjects were able to improve usual time spent with family, friends and were able to enjoy daily activities. It is also possible that the unusually high scores on state anxiety at pre intervention simply regressed closer to the mean or norm, at post intervention.

Our study suggests that over time, listening to relaxing music may be more effective than guided imagery in bringing about changes necessary to enhance the quality of life for the patient undergoing treatment for cancer. However, these findings should be interpreted in light of the fact that the imagery group did contain more lower functioning subjects than did the music group. Although we found no main effect in the ANCOVA for level of functioning on quality of life, the correlations at post intervention did show that subjects who had been rated by their physician as lower functioning also reported a lower quality of life. In addition, the multiple regression analysis indicated that level of functioning even prior to intervention, was a significant predictor of changes in quality of life, with higher

functioning subjects enjoying greater increases in quality of life. This finding suggests that regardless of type of intervention, lower functioning subjects will experience the least change in quality of life. A replication of this study with a larger sample size might further implicate level of functioning as an important factor influencing one's quality of life.

Previous research has indicated that quality of life can be much improved through the use of hypnotic imagery. Margolis (1983) taught hypnosis to terminal cancer patients and found that family interactions improved as did the patient's ability to relax. Similarly, Gardner (1976) used hypnotherapy to improve the quality of life for an eleven year old cancer patient. Based on these previous research studies, we would expect a similar intervention such as our relaxation plus guided imagery group to have an impact on the quality of daily living. Perhaps our imagery exercise served only to remind the subject of the chemotherapy and of the fact that they had cancer. We asked subjects to imagine themselves as calm and relaxed while the chemotherapy was taking place. Subjects were also taught to visualize the chemotherapy as well as their cancer cells. For some individuals, this may have actually caused more upset than benefit. Perhaps those subjects listening to relaxing music were able to distract their thoughts away from the unpleasantness of the treatment, rather than focusing on it. By listening to music, subjects were free to imagine anything they chose to, unlike the imagery group subjects who were instructed in visualization techniques. This supports the use of an indirect method of relaxation - allowing the subject to focus on whatever they find

relaxing. Perhaps listening to music allowed a "time out" for subjects who enjoyed its relaxing effects. The imagery group subjects in our study did not have this advantage, as they were asked to think about their cancer as well as their treatment each day while practicing the relaxation exercise. The therapeutic benefits of music have long been advocated. Recent studies support its use with chronic patients. Rider (1987) used relaxing music to guide client's images of healing states. Presant et al (1990) gave cancer patients on active treatment audiotapes containing guided imagery with relaxing music in the background. The researchers found that such tapes were well received by patients, although they suggest that the musical preferences of the subjects should be taken into consideration by offering several different types of music. Certainly, most people have enjoyed the relaxing benefits that listening to music can bring, as well as the special feelings or emotions elicited by a particular song or melody. Dr. Bernie Seigal, a well known physician who works with cancer patients, feels that certain types of music can have a healing effect, and he prescribes relaxing music for his patients (Seigal, 1989).

In addition, the analysis of variance indicated a main effect for chemotherapy intensity on the quality of life of subjects. Regardless of which group subjects were assigned to, those receiving less severe intensities of chemotherapy reported a higher quality of life than those receiving more toxic treatments. Correlations at post intervention likewise show that subjects receiving a less intense chemotherapy regime also report a higher quality of life. Certainly, someone undergoing a rigorous treatment with "sick making" drugs, is likely to

report a lower quality of life in comparison to a patient receiving a mild dose of treatment. Because the FLIC measures things such as nausea and vomiting, an individual who is physically sick due to the treatment itself, is likely going to report a low quality of life. Perhaps the subjects in the imagery group rated as lower functioning may have benefited more from increased personal attention from a therapist. Practicing relaxation alone may not be sufficient to improve the quality of life for these more debilitated individuals.

It may be that nonspecific factors such as increased attention from a therapist, are largely responsible for the improvement of some of our subjects on some measures. If subjects receive more individual attention from a therapist, there may be a greater number of other variables influencing changes, such as placebo, increased control, etc. Certainly, this issue of case study versus a larger N study needs to be further addressed. Morrow & Dobkin (1988) theorize that nonspecific factors, such as attention from a therapist, demand characteristics, or placebo may be responsible for the success of behavioural interventions with cancer patients. Lyles et al (1982) disagree, however. They attribute improvement not to nonspecific factors, but to three separate variables. Firstly, behavioural interventions assist the person in relaxation, reducing muscle tension, anxiety and physiological arousal. This in turn reduces side effects of treatment such as gastrointestinal upset that can be exacerbated by high levels of anxiety, affecting quality of life. Secondly, relaxation and imagery may serve as cognitive distractors. By learning to focus on pleasant thoughts and feelings, rather than on anxiety, patients can lessen

anxiety reactions. Thirdly, many persons who learn behavioural interventions and subsequently observe a decrease in anxiety levels or a change in feelings and emotions, also feel a decrease in their sense of helplessness. By learning a skill that they can practice, a sense of control can be regained. Our study suggests that perhaps, if chemotherapy patients can learn to distract their thoughts from the unpleasantness of treatment (eg. by listening to music), anxiety levels drop, and quality of life increases. Relaxing music may have given the subjects an opportunity to temporarily take their minds away from the experience of treatment. This type of indirect relaxation technique may be more helpful than a guided imagery approach.

Perhaps, it is not the psychological "technique" that is the factor initiating changes in the cancer patient, for example, a carefully prepared imagery script, but rather something as simple as a quiet time each day spent listening to relaxing music. Given the fact that chemotherapy treatments were progressing during the time that subjects participated in our intervention, it is noteworthy that quality of life did increase for some subjects. The side effects of treatment are well known, and may include nausea, vomiting, and hair loss. One would not expect an individual undergoing such a potentially debilitating treatment to report any increase in quality of life, especially a significant one, as experienced by the subjects in our music group. Our results, although tending to support music as an adjunctive treatment, remain tentative until a replication is completed, controlling for factors such as the toxicity of treatment level and physical functioning. Possible limitations of this study

include the lack of a no-treatment control group. It is possible that the reduction in anxiety experienced by both groups was a natural occurrence that happens after patients become accustomed to treatment. Perhaps the most anxious time is prior to the first treatment, when patients do not know what to expect or how sick they will become from the side effects of medication. A no-treatment control group would have allowed for the assessment of chemotherapy patients who were not receiving any form of intervention. These subjects may have indicated a decrease in quality of life, as opposed to the imagery and music groups.

Future research may replicate the finding that low attributions of internal health locus of control are a significant predictor of improvement on a measure of quality of life. A further issue is whether or not quality of life is related to completion and compliance rates with treatment. Perhaps patients who tend to attribute health to personal actions also tend to have higher compliance rates with treatment when it involves some sense of self efficacy. Conversely, patients who don't want control may also comply with treatment if they perceive that it requires no personal responsibility for health.

Future research in this area might replicate this study with a larger sample size, and include a waiting list control group. In addition, type of cancer is a variable that could be controlled for, as this may be a factor influencing level of functioning and quality of life of patients. Perhaps a program designed to alter patients' attributions of health locus of control might be examined, such as a cognitive restructuring approach.

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Appendix A

Research Consent Form

INFORMATION AND CONSENT FORM
FOR PARTICIPANTS IN THE
RELAXATION STUDY

This is a brief outline of the nature and purpose of our study in which we hope you will agree to participate. We are interested in the benefits of relaxation and mental preparation for cancer patients undergoing chemotherapy treatment, as many will experience any number of both physical and emotional side-effects. Physical side effects may include sleep and appetite disturbance, nausea, and general or specific discomfort, while feelings of anxiety and depression are among the emotional effects that are often reported by patients.

A variety of relaxation techniques can be used to teach patients how to cope with the effects of treatment and thereby feel less threatened and more at ease. Although everyone reacts differently to the stress of diagnosis and treatment, many report that they find the loss of control over their normal reactions (the "emotional rollercoaster"), to be most troublesome. We are proposing that patients who engage in daily relaxation under the guidance of a counsellor will fare better, both physically and emotionally.

Participants will be randomly assigned to one of two different types of relaxation, and will meet with the investigator weekly (immediately prior to treatment, when possible). Each subject will be given an audio-tape recording for personal use during their treatments and for their daily home use. They will also be asked to complete brief questionnaires that ask questions about daily activities and emotional and physical well being.

If you have any questions about the study or about your role, please feel free to contact myself or Dr. Sellick at any time. Dr. Sellick can be reached by calling the centre between 8:30 and 4:30 at 343-1610.

Thank you for your consideration.

I have read the above and have spoken with the investigator. I am willing to participate in the above-mentioned study and understand what will be expected of me. I have been assured that my participation is voluntary, and that should I not choose to participate, I may still make use of the psychological services available at the Centre. I also understand that I may withdraw from the study at any time.

NAME _____

DATE _____

WITNESS _____

DATE _____

Appendix B
Guided Imagery Script

RELAXATION SCRIPT TO BE READ ALOUD
AND TO BE AUDIO-TAPED FOR
CLIENTS' USE DURING TREATMENT
AND AT HOME

I would like you to set aside some time for yourself, for the next little while, to allow yourself to become comfortable and relaxed, as relaxed and as comfortable as you can be.

Just do whatever you need to - whether it be adjusting your posture, shifting your weight, moving your head around until it finds a comfortable position (resting comfortably or balanced gently atop your neck) - to make yourself comfortable, increasingly more and more relaxed.

Now, take a long, slow, deep breath, letting your eyes close slowly as you exhale.

Deep breathing can feel like a deep inner cleansing, like a purification of your body and your mind so that with each breath out you can imagine your mind and your body rid of tension and any negative thoughts or feelings . . . that each breath out can bring about an increase in your sense of physical and mental relaxation. Isn't it nice to imagine the negative being replaced by good thoughts, pleasant feelings, and a sense of physical calm and well-being . . . each time you take in a fresh breath.

Breathe slowly and deeply, letting your lungs expand to their fullest.

With every breath you take, you will become more and more relaxed.

Let go of tension and doubts. This is your time, you are safe within this place of gentle peace while concentrating, focusing on you . . . attending to your mind and body . . . bringing about as much relaxation as you can.

Inhale ----- fully and deeply
Exhale ----- let go of doubts

Inhale ----- go deeper into relaxation
Exhale ----- release anxiety and tension

Inhale ----- thoughts drift away
Exhale ----- at peace with the world

Now, at the count of 3, I want to suggest to you that you can imagine yourself in a beautiful setting, perhaps outside enjoying the world around you.

Picture it...

The sky is blue, the sun is warm and directly overhead, and occasionally, a cloud will pass by.

Create and experience a warm, gentle breeze blowing over your body . . . it's your kind of day . . . just the right amount of sunlight, warmth, and gentle breeze . . . the kind of day you can enjoy . . . the kind of day you always look forward to and wish that it would never end.

While picturing yourself in that pleasant place . . . I want you to feel the pleasure and peace of relaxation as it enters into every muscle and every system of your body.

In your mind, in your imagination, focus the light from the sun over your right arm.

Feel it begin to penetrate and move from the fingertips to the shoulder, and feel it beginning to get very, very warm and your whole body begin to slow down.

Feel yourself being bathed in this warm, radiant light. This light and its warmth can be so soothing, relaxing, healing . .

Perhaps you can feel the warmth of the sun in your mind, in your imagination and sense that your right arm is becoming more and more relaxed . . . very, very relaxed.

You know, some people say that when they begin to get relaxed, that arm or their entire body begins to feel very heavy, others say it begins to feel very light and tingly. Now, whatever you're experiencing, it is uniquely yours.

Continuing to breath easily and rhythmically . . . each breath being a cleansing and perhaps invigorating breath . . .

Now, move the light from the sun from the right arm to the left. And from the tips of your fingers all the way to your shoulders, relaxing your left arm.

Now, to help you relax even more, I'm going to count to you from 8 down to 1, and on each and every descending number, I want you to feel yourself relaxing and going deeper, down deeper and down deeper.... into a quiet state of peace, of calm, of positive expectations that you can do something for yourself so that you - your mind and your body - are as comfortable and as relaxed as you can possibly be . . . feeling relaxed, very, very, relaxed.

8....7....6....5 relaxing more now

4...letting go...3.....2.....1...relaxed

Continuing to breath easily and rhythmically
Gently now, move the light from the sun down to your right leg, and let it slowly move from your toes - up, right up to your hip and waist, move the light back and forth and relax that right leg. Notice any changes in your right leg . . . sensations of relaxation . . .

Feel the sunlight, becoming more and more aware of the comforting breeze gently blowing over your body, as a wave of relaxation.

The sky is beautiful, the clouds majestic, and there's a feeling of peace.

Right now, move the light from the sun over to your left leg, and move slowly from your toes up, right up to your hip and waist . . . relaxing your left leg.

It seems that with each word that I utter and that with each breath that you take, you find yourself drifting deeper and deeper, becoming more and more relaxed, more and more at ease.

And if you sense any tension or uneasiness in your body, anywhere, your abdomen for example, you can move the light from the sun over this area . . . do that, right now . . . and you may feel the warmth, soothing and relaxing that area so that the tension slowly dissolves . . . and you are left with that unique feeling of peace and relaxation.

Bring the light from the sun up through your chest, and imagine it permeating your whole being . . . your heart and lungs, and all the muscles of your chest and shoulders.

Imagine the light energizing, cleansing and empowering you.

Move the light now even further up through you neck and into your head . . . relaxing the muscles of your shoulders even further, your neck muscles and moving right up over the top of your head . . . and then like a waterfall of light pouring down upon you . . . spreading relaxation throughout your whole body, fingers of relaxation easing the tension, seeking out any trace of unease or discomfort . . . and soothing that area . . . restoring warmth and comfort. Gently moving down your spine until it touches your tabling and and radiating through every nerve and fibre.

And just focus for a moment on the muscles around your eyes and your mouth . . . the small muscles that can so often being tense as we squint or frown . . .move your jaw around . . . close your eyes tightly for a moment . . . and then relax your facial muscles . . . your forehead, your eyes, your mouth . . .very, very relaxed . . . breathing easily and rhythmically . . .

You are now in a state of deep relaxation. This is the perfect state to be in for visualization, for using your mind to focus on good and positive things. Now that you've spent some time using your imagination and visualizing the warming and relaxing power of the sunlight, let's spend a few moments taking this one

step further and imagine ways in which you can ready yourself physically and mentally for your chemotherapy treatment.

Chemotherapy has been explained to you and you now have at least a partial understanding of how it works . . . you may picture it in any number of ways and let me suggest that your experience of chemotherapy will be improved if you are able to receive it in a relaxed fashion, that is, being as physically and mentally comfortable as you can be.

As you imagine what is happening as the chemotherapy is administered, you may find it useful to use the images or pictures that others have found helpful in maintaining a relaxed and positive attitude . . . minimizing the distress and focusing on good thoughts and pleasant feelings.

You may wish to remain with the relaxing image of the sunlight and imagine the drugs moving throughout your relaxed body and seeking out and melting or dissolving cancerous cells . . .

OR, imagine that the treatment moves like light (like tiny flashlights), seeking out and wreaking havoc with cancerous cells, interfering with them as they try to multiply . . . so that the cancerous cells fade under influence of the light of the treatment . . . picture this as you wish . . .

OR, imagine cancer cells giving up, huddling together like defeated rouges, surrendering under a white flag as the sunlight, the chemotherapy, does its business.

OR, use whatever images, pictures, maps, or metaphors are going to be most useful for you . . . are going to help you maintain as much physical relaxation and as much mental calm . . . as you can . . . breathing easily and rhythmically

AND trust yourself . . . that wherever discomfort or anxiety appears, you can turn and focus upon it, using any of your skills to regain these feelings of relaxation . . . breathing easily . . . focusing on useful, helpful images . . . thinking on the positive and the pleasant . . . and that at any time during treatment and recover between sessions you can call upon these, your resources (an inner healer if you wish), and restore your sense of physical relaxation and mental calm - as the drugs and medications carry on and do what they have been designed to do . . . fully expecting the desired effects and picturing for yourself what that looks like . . . this treatment, imagined perhaps as light moving throughout your body, warm sunlight seeking out and destroying cancer cells, is your healer, it is you shield and your protector . . . call upon this image as often as you like . . .

Take as much time as you wish, as you need, to continue breathing easily, enjoying the feelings, the sensations of relaxation and well-being. Allow your whole mind and body to just be still, to appreciate the experience, and to remind

yourself that you can call upon these feelings at any time, whenever you wish, and perhaps by simply sitting quietly, breathing easily, and allowing your mind, giving it the time, to take care of you.

You can linger here for as long as you wish OR you can re-orient yourself to this room and return from this pleasant state with a renewed sense of your own capabilities, relaxed and yet alert . . . ready to face the challenges of the day. Of course, if you so wish, you may linger and allow yourself to drift off to sleep, a pleasant and restful sleep.

Whatever . . . and carry on . . .

Prepared by: S. M. Sellick, Ph.D.
G. Straw, M.A. Cand.

1989/05/01

Appendix C
Relaxing Music

Appendix CRelaxing Music**Side A** Classical Music

1. Pachelbel (Leppard, R) : Canon in D Major (6:25)
2. Bach, J: Sinfonia from Contata No. 156 (2:44)
3. Bach, J: Air from Suite No. 3 in D Major (5:33)
4. Albinoni, G: Adagio from Concerto in D Minor for Organ and Strings in G Minor (8:23)
5. Allesandro, M: Adagio from Concerto in D Minor for Oboe and Strings (3:36)
6. Vivaldi, G: Largo from Concerto in D Major for Guitar and Strings (4:13)

From Raymond Leppard and the English Chamber Orchestra,
CBS Records-Masterworks (WMYK 38482).

Side B New Age Music

1. Lanz, D: Song for Monet - Nightfall (8:47)
2. Lee, G: Running Dances - Impressions (3:50)
3. Jones, M: Mexican Memories - Seascapes (8:08)
4. Lanz, D: Leaves on the Seine - Nightfall (4:18)

From Narada Sampler #1, Narada Productions Inc., A&M
Records (C-7007)

Appendix D
Functional Living Index for Cancer

Appendix E
Physician Information Sheet

Appendix E**Physician Information Sheet**

To be completed by physician upon
referral to Psychology research
program :

Name: _____

Diagnosis: _____

ECOG performance score:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4

Intensity of chemotherapy regime:

mild
 moderate
 severe

Completed by: _____

Appendix F

Mean Age of Subjects and Diagnoses

Appendix F
Mean Age of Subjects and Diagnoses

	<u>Imagery</u>	<u>Music</u>
Mean age	48.5	50.11
No. of Males	3	3
No. of Females	7	6
<hr/>		
<u>Diagnoses</u>		
ovary	1	ovary 1
breast	2	breast 3
glioma	1	histiocytoma 1
lung	2	rectum 1
tonsil	1	non hodgkins 2
hodgkins	2	colon 1
lymphoma	1	
<hr/>		

Appendix G
Analysis of Covariance
State Anxiety

Appendix G
Analysis of Covariance
State Anxiety

<u>Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean square</u>	<u>F</u>	<u>Significance</u>
Covariate	819.037	1	819.037	13.42	.002
Main effect	19.174	1	19.174	.314	.583
Total	1814.737	18	100.819		

Appendix H
Analysis of covariance
Trait Anxiety

Appendix H
Analysis of covariance
Trait Anxiety

<u>Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean square</u>	<u>F</u>	<u>Significance</u>
Covariate	543.088	1	543.088	7.328	.016
Main effect	87.190	1	87.190	1.176	.294
Total	1816.105	18	100.895		

Appendix I
Analysis of Covariance
Quality of Life

Appendix I
Analysis of Covariance
Quality of Life

<u>Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean square</u>	<u>F</u>	<u>Significance</u>
Covariate	4488.515	1	4488.515	30.25	.000
Main effect	1486.380	1	1486.380	10.018	.006
Total	8348.947	18	463.830		

Appendix J
Two Way Analysis of Covariance
Group and ECOG Rating

Appendix JTwo Way Analysis of CovarianceGroup and ECOG Rating

<u>Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean square</u>	<u>F</u>	<u>Significance</u>
Covariate	4488.515	1	4488.515	29.61	.000
Main effect	1855.735	3	618.578	4.081	.030
Group	559.320	1	559.320	3.690	.077
ECOG	369.355	2	184.677	1.218	.327
Grp X ECOG	34.057	2	34.057	.225	.643
Total	8348.947	18	463.830		

Appendix K

Two Way Analysis of Covariance

Group and Chemotherapy Intensity

Appendix K
Two Way Analysis of Covariance
Group and Chemotherapy Intensity

<u>Source</u>	<u>Sum of squares</u>	<u>DF</u>	<u>Mean square</u>	<u>F</u>	<u>Significance</u>
Covariate	4488.515	1	4488.515	36.595	.000
Main effect	2139.432	2	1069.716	8.721	.003
Group	964.072	1	964.072	7.860	.014
Chemo	653.052	1	653.052	5.324	.037
Grp X Chemo	3.841	1	3.841	.031	.862
Total	8348.947	18	463.830		

Appendix L
Multiple Regression
Change Scores for Quality of Life

Appendix L
Multiple Regression
Change Scores for Quality of Life

<u>Variable</u>	<u>R Square</u>	<u>F</u>	<u>Significance</u>	<u>Beta</u>	<u>t</u>	<u>Significance</u>
IHLC	.39	11.08	.004	-.628	-3.33	.004
ECOG	.56	10.02	.001	-.404	-2.41	.028
SAI	.66	9.80	.000	.329	2.17	.046

Appendix M
Follow-up Questionnaire

Appendix M
Follow-up Questionnaire

1. Please rate the degree to which you enjoyed participating in the study.

1	2	3	4	5	6	7	
Not at all					Very much		

2. What did you like best about the program?
3. If we were to run this study again, can you suggest any areas for improvement?
4. Please indicate the degree to which this program was beneficial to you.
- Not at all _____
- To a slight degree _____
- To a moderate degree _____
- Very beneficial _____
5. If so, in what way(s) did you benefit? (eg. sleep, appetite, interpersonal relationships, etc.)

Appendix N

Comments Concerning Study Participation

Appendix N**Comments Concerning Study Participation**

"The music helped me to relax and enabled me to sleep."

"After listening to the music I could sleep better."

"When I first started chemo I thought that I would brave it out but found that the relaxation tape I borrowed really helped at home. One night by my second or third chemo, I believe, I was really anxious and pulled the tape out of the drawer and put it on. It really helped me relax and draw my thoughts from the negative to the positive regarding chemo. Thanks!"