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The effect of a single music therapy session on hospitalized children as measured by salivary immunoglobulin A, speech pause time, and a Patient Opinion Likert Scale

Lane, Deforia Lorraine, Ph.D.

Case Western Reserve University, 1991
THE EFFECT OF A SINGLE MUSIC THERAPY SESSION ON HOSPITALIZED CHILDREN AS MEASURED BY SALIVARY IMMUNOGLOBULIN A, SPEECH PAUSE TIME, AND A PATIENT OPINION LIKERT SCALE

by

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Submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy

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Abstract

by

DEFORIA LORRAINE LANE

The purpose of this study was to determine whether a single 30-minute music therapy session significantly affected the mood of hospitalized children, as measured by Salivary Immunoglobulin A (IgA), Speech Pause Time, and a Patient Opinion Likert Scale. A pretest/posttest design was used. Subjects were 40 pediatric in-patients between the ages of 6 and 12 at Rainbow Babies and Childrens Hospital in Cleveland, Ohio. Each child was randomly assigned to the experimental (N=20) or control group (N=20). Intervention consisted of a hello song, passing, playing and identifying instruments, singing, imitation and listening games and a closure song. Subjects in the control group were allowed to continue for 30 minutes in whatever activity they were engaged at the time (reading, playing video games, talking on the phone). Each child was tested individually before and after the 30 minutes and care was taken to prevent aversive medical interruptions during the intervention.
treatment group showed a significant increase in IgA (p≤.01) from pretest to posttest while the control group did not. Data showed no significant difference between the pretest and posttest for either group’s Speech Pause Time or Patient Opinion Likert scores. The Wilcoxon ranked-sum test revealed no significant difference between groups in the mean change in IgA, SPT, or Likert scores. Data suggest that a 30-minute music therapy session can have a significant effect in increasing IgA of hospitalized children.
ACKNOWLEDGEMENTS

I am especially indebted to my committee chairman and advisor, Dr. John Kratus, whose propensity for excellence was motivating and invaluable. I extend my grateful thanks to my committee members Dr. Karen Olness, Dr. Nahida Gordon, and Dr. Cynthia Taggart for their counsel and encouragement throughout this research project. My appreciation to Dr. Peter Webster, whose kindness and interest in my work motivated me to begin this document.

A special word of thanks to music therapist Leanne Mooney, who assisted me in collecting data, and to Dr. Wayne Rusin who instructed me in the laboratory.

My husband, Ernest Luther Lane, deserves my heartfelt thanks for showering me with his patience, love and understanding as I completed this degree. My sons, Martin and Curtis have shared their hugs, smiles and kisses during the moments I needed them most. Indeed, none of this would have been possible had it not been for the nurture, wisdom and love of my parents, Mr. and Mrs. Elbert Sims. To them I offer my deepest appreciation.

Finally, I give honor to my Lord, Jesus Christ, who has provided more than my heart could ever imagine. I offer Him my heart, my mind, and my life.
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CHAPTER I

RATIONALE AND PURPOSE OF THE STUDY

Introduction

Music therapy is the prescribed use of music to aid in the physical and psychological rehabilitation of patients. In recent years music therapy has become more visible and accepted in the medical profession. The increasingly popular concept of wholistic health care has given rise to the inclusion of music therapy in the hospital setting. Along with these opportunities has come the need to integrate the services music therapists offer into a framework that is acceptable to the medical profession.

It is a difficult to explain or demonstrate the concept and efficacy of music therapy within the strict confines of the empirical research model. The essence of what music therapists do, and how it is accomplished cannot be separated from the interpersonal dynamics between the music, the therapist and the patient. At best this intangible aspect of music therapy often resists the confines of quantitative measurement. This study attempts to lessen that resistance by trying to measure those dynamics from a physiological and psychological perspective. The purpose of this research is to investigate the effects of a single 30-minute interactive music therapy session on hospitalized children.
The first section of chapter one presents a rationale for music therapy in a hospital setting, along with a discussion of music therapy goals and objectives and their relationship to the physical, and psychosocial needs of hospitalized patients. Section two includes the discussion of the value of music therapy in hospitals and the need for the profession to prove its worth and efficacy. Section three contains a description of the purpose of the research study, the reasons for the measures used, and a brief statement about the results. Finally, chapter one concludes with an overview of each of the remaining chapters in this dissertation.

Rationale for Music Therapy Programming with Hospitalized Patients

Addressing patient's emotional and psychological needs appears to be of growing concern to health care professionals who service a variety of populations. The American Cancer Society (ACS) is one organization that is attempting to address those needs. ACS (1990) states in its "Cancer Facts & Figures - 1990" update that its ongoing research is "expanding to include not only patients' physical well-being but also their psychosocial needs" (p. 5). The update reports that patients' and families' reactions to the disease and ways to provide psychosocial support have emerged as "important areas of research and clinical care" (p. 5). With longer survival periods for many cancer patients and similar chronic diseases, health professionals are becoming increasingly interested in quality-of-life issues.
For children and adults, hospitalization can mean a disruption in normal living patterns. School, occupational involvement and normal social patterns are often interrupted. Patient programming may include support groups, the utilization of techniques such as hypnosis, guided imagery and massage and the creative arts therapies. These approaches can help to minimize psychological trauma and encourage opportunities for leisure, learning, self-expression and family and peer interaction. Music therapy, the primary focus of this research, can provide patients with additional coping strategies. Bailey (1983a) found that the use of live music with cancer patients and their families can have a comforting emotional and physical effect. Christenberry (1979) states that the severe physiological and psychosocial needs of some patients may not be adequately met by the medical team alone, and suggests that music therapy can provide reinforcement and therapeutic gain to a patient's protocol. An increasing amount of research suggests that music can counter the effects of stress and anxiety as well as enhance self-esteem and feelings of well-being. The arts have the potential to enhance the quality of life and are a pleasurable, ongoing part of daily living. They can help bridge the distance between hospital confinement and home. The aesthetic experiences, enjoyment and creativity inherent in the arts can play a distinct role in hospital programming if the medical profession is to address the comprehensive needs of its patients.
Patient Needs

Excessive anxiety and stress related to illness, separation and hospitalization can be emotionally damaging to children and adults, and can interfere with optimal response to medical treatment. Normal growth and development can be jeopardized and physical and environmental limitations can erode self-esteem. For example, the possible physical side effects of cancer treatment include hair loss, skin breakdown, loss of appetite, stomatitis (mouth sores), nausea, vomiting, edema (swelling) and respiratory dysfunction. It is difficult to completely quantify the emotional trauma that accompanies such experiences.

Goloff (1984) conducted a questionnaire study of 49 hospitalized medical patients at Bellevue General Hospital in New York to explore patient perception and response to music therapy. The questionnaire focused on the following parameters:

1. Physical discomfort: Would patients feel physically worse, the same, or better directly following music therapy?
2. Affective state: Would music therapy cause any immediate change in patient’s moods or outlooks?
3. Subjective response to music therapy: Would patients feel that in its own right and as compared to other available activities, music therapy is helpful to them while they are in the hospital?
4. Feelings about being in the hospital: Would patients feel that participation in music therapy makes a hospital stay any more or less pleasant?

Goloff found that patients who received music therapy viewed their hospitalization more positively, reported reduced physical discomfort, and experienced significant improvement in four of six mood parameters. Furthermore, a “highly favorable evaluation” of music therapy emerged as a result of the study, suggesting that music therapy may advantageous to patients in a general hospital. This study is described in more detail in the literature review in Chapter II.

Addressing the problem of pain can pose grave concern for hospitalized patients. Australian music therapist Ruth Bright (1989) contends that, in the case of terminal illness several types of pain are experienced: physical pain, which requires analgesia; social pain, which presents a strain in personal relationships and or personal role changes in society; spiritual pain, which can be manifested in questioning the reason for suffering; and financial pain, which is the patients’ anxiety about those they previously supported, cost of illness and treatment.

One of the roles of a music therapist is to provide a nonthreatening, accepting environment for patients. According to researchers, the act of composing lyrics, listening to a live performance, playing an instrument or singing can assist in providing physical and emotional comfort to hospitalized patients (Bailey, 1983a, 1983b, 1986; Guzzetta, 1989). Bailey (1983a) comments on the importance of both the
therapist and the music regarding the outcome of the music therapy session. She contends that the three factors that govern the success of music therapy as a pain intervention are the use of the patient’s personal preference of music; the characteristics of the music itself, that is, tempo, melody and harmony; and the caring presence of the music therapist. She further states, “When a music therapist applies the unique qualities of music to specific patient needs, reduced anxiety, decreased symptoms of depression and withdrawal, and improved self-esteem may occur.”

Bailey has further observed in her work that music is not only soothing, relaxing and energizing to her patients but it encourages expression of thoughts and feelings, helps integrate the family and patients into their social environments and provides a tool that “potentially reaches levels of consciousness unreachable by words and bodily touch.” She uses flowing rhythms and slow tempos to elicit relaxation and percussive rhythms, swift tempos, and complex harmonies to promote energy. She also uses mood music and pictorial associative music, songs and instruments to unblock tension, encourage emotional release and enhance self expression.

In an attempt to further explain how music may impact patients Guzzetta (1989) looked at mind modulation, defined as the natural process by which thoughts, feelings, attitudes and emotions (neural messages) are converted in the brain. These messages are converted by the brain into neurohormonal messenger molecules and sent throughout all the body systems. These in turn are capable of producing changes in
the autonomic, endocrine, immune and neuropeptide systems. Her study with cardiac patients found that the incidence of cardiac complications was lower in the music therapy group, and that the subjects in that group reported that such therapy was helpful. Following a relaxation induction from a standardized head-to-toe relaxation script, subjects in the music group practiced listening to a 20-minute "soothing" cassette tape twice a day for a total of three sessions over a 2-day period. Subjects in the relaxation group received the same relaxation induction followed by sitting quietly with closed eyes for 20 minutes and repeating the word "one." Data consisted of pretest-posttest apical heart rates and peripheral finger temperatures and showed that the relaxation and music therapy were more effective than no intervention in lowering heart rates. In addition the finger temperature increased more substantially in patients in the music therapy group than in the relaxation group or control group. Guzzetta concluded that the cumulative effects of practicing and the combination of music therapy and relaxation and the fact that most of the patients enjoyed the music therapy sessions, contributed to the significantly lower heart rates and raised peripheral temperatures.

Researchers report that music therapy can elicit social interactions by arousing interest, increase verbal and vocal participation, and modify negative self-concept (Millard & Smith, 1989). Music therapy is also reported to be an efficient modality for producing self-perceived changes in relaxation, feeling, and improved mood, and has a significant impact on positive thoughts about one's life (Davis & Thaut, 1989;
Barron, 1990). Bailey (1983a) asserts that the music therapist's presence might be especially meaningful to a hospitalized patient and this human contact could potentiate the diminishing of a patient's feelings of isolation and thus effect change of mood for the better.

It appears evident that the findings of some of the music therapy research correspond to the needs of hospitalized patients. Music therapy then seems to have the potential to contribute meaningfully to the patient's perception of involvement, improve his mood, increase comfort, reduce feelings of isolation, affect immune response, encourage verbal and nonverbal communication, and assist him in regaining or maintaining a positive self-image. These findings form the basis upon which this study is conducted.

Patient Goals and Objectives

Former president of the National Association for Music Therapy, Cheryl Maranto (1988), lists 14 possible goals of music therapy based on reported needs of AIDS and ARC patients. Though the prognosis for others with different diagnoses may sometimes be less ominous than that of AIDS patients, these goals address needs common to many hospitalized patients.

1. To minimize maladaptive personality traits or characteristics
2. To increase psychological defenses and emotional hardiness
3. To assist in the identification and expression of feelings, particularly at the nonverbal level
4. To provide a group support system, where members listen to individual needs
5. To facilitate feelings of personal meaningfulness
6. To provide for individual choices and sense of control
7. To minimize physical and emotional stress through relaxation
8. To decrease feelings of isolation and rejection, and promote feelings of closeness
9. To assist in the identification of the current "stage" of acceptance, and to facilitate movement through the various stages towards acceptance
10. To increase self-esteem and self-acceptance
11. To allow expression of anger and fear
12. To provide reality orientation
13. To provide spiritual support, optimism, and hope, and
14. To facilitate reminiscence and life-review (p. 80).

Bright (1989) suggests music therapy goals for therapists working with patients with terminal illness. She maintains that music therapists must be clear about what they hope the patients will achieve and develop appropriate competencies for dealing with the terminally ill. She stresses that therapists need to examine their own attitudes toward life, suffering and death, because often they must work with patients whose belief system differ dramatically from their own, and such differences require a special empathy on the part of the therapist. Bright's goals are as follows:
1. To strengthen, in any way which is appropriate, the patient's fight against terminal illness and disability
2. To take patient's minds off their impending death
3. To help in pain control
4. To help the patient, if he wishes, to talk openly about his feelings, angers and fears in an atmosphere of trust and calm
5. To help the patient to resolve old conflicts and griefs which have been re-activated by present griefs
6. To promote better communication between the patient and significant others
7. To provide the patient an avenue for creativity and enjoyment (p. 13).

Spintge and Droh (1985) state that anxiety and pain are the most common reasons why a patient visits a doctor. They further list some of the most important pathophysiological implications of anxiety and pain:

1. Arrhythmias, angina pectoris, hypertension, hyperventilation, and even asthma, which occur in the cardiopulmonary system
2. A lowered threshold of pain tolerance and a general hyperesthesia
3. Increased muscle tension and excitement
4. The rising of plasma levels of catecholamines, steroids, and endogenous opioids
5. Impaired subjective feeling of the patient that in turn creates inadequate defense reactions and reduces compliance.

6. An increased demand for anxiolytic and analgesic drugs.

Spintge and Droh contend that physicians must try to influence the psychophysical well-being of the patient and that in some cases pharmaceutical or psychological means alone are often insufficient in producing desired results. They describe the stressful, overwhelming fear of some patients as "regression" and state that this regression needs to be addressed through nonverbal communication to establish an emotional connection with the patient.

In summary these goals suggest that music therapy can help to lessen the physical and emotional distress of the dying patient through diversion, by facilitating communication and providing avenues for self-examination, introspection, and enjoyment.

**Need for Research in Music Therapy**

Clinical research, empirical data and substantive evaluation techniques are of particular importance in medicine and have posed a challenge to music therapists, in that it is difficult to objectively quantify the emotional, physical or psychosocial impact music has upon patients. Though a patient's response may include such descriptors as "uplifting," "calming," "soothing," or "energizing," it is difficult to quantify these comments as data.
Results of a survey by Siegel, Cartwright, and Katz (1986) found that music therapists expressed a need for and interest in research on biofeedback, physiological responses and relaxation/ guided imagery. Seigel, Cartwright, and Katz also contend that because music therapy is a relatively young profession, clinical practices should be substantiated and confirmed with research. Another area of increasing interest to the music therapist is that of psychoneuroimmunology, the study of the relationship between the mind and the immune system. Research in the area of music and psychoneuroimmunology has suggested that the appropriate use of music can significantly address and influence a variety of patient needs. Researchers in music therapy, music education and health care have found music can accomplish the following:

1. Decrease pain perception (Bonny, 1978; Hanser, et al 1983; Standley, 1986),
2. Decrease anxiety and depression (Bonny, 1978; Chetta, 1981; Scartelli, 1984),
4. Increase immunological defenses (Rider, Floyd & Kirkpatrick, 1985),
5. Encourage resolution of issues and grief (Bailey, 1984), and

Many of the research studies in music therapy evaluate what effects listening to tape recorded music has on the autonomic nervous
system, by monitoring such functions as blood pressure, heart rate, galvonic skin response and finger temperature. Such studies include those by Logan and Roberts (1984) on the effects of music on tension level, and Davis and Thaut (1989) on the influence of music on anxiety, relaxation and physiological responses. Still other studies focus on the effects of music as measured by immunological changes or describe the interactive procedures between therapist, music and client as measured by psychological tests, surveys or self-reporting. The interactive component of a music session that occurs between therapist and patient is an integral part of the therapeutic process. This study’s design attempts to measure that response from both a physiological and psychological perspective.

Jellison (1973) reports that of the music therapy research published between 1952 and 1972, descriptive articles were most common, followed by philosophical, experimental, and historical studies. She also notes an increase in the frequency of experimental articles, and in studies using behavioral and statistical research designs. Gilbert (1979) reported an increase in the proportion of descriptive and experimental research between the years 1973-1978 and interpreted this expansion as a continuing trend toward objectivity in music therapy research.

**Purpose of the Study**

Researching the relationship between music and patient psychological and physiological well-being can strengthen the case for
music therapy programming, broaden the music therapy research base and provide justification for its cost effectiveness. The issues of accountability and cost effectiveness of music therapy are of great significance in this era of escalating health care costs. Health maintenance organizations and insurers have requires specific data that reflect appropriate goals and effectiveness of treatment in order to justify third party reimbursement. "Administrators who either influence staffing patterns or reimbursement will judge music therapy treatment on its cost, as well as its demonstrated effectiveness" (Dziwak & Gfeller, 1988, p. 29). Dziwak and Gfeller also state that "music therapists who can provide clear documentation of the beneficial outcome and cost-effectiveness of their work stand a better chance of survival in today's health care arena" (p. 28). The Task Force on Reimbursement of the National Association for Music Therapy has stressed the need for cost-effectiveness data in order to persuade third party payers that music therapy services should qualify for reimbursement.

Some of the technological advances in medical research, such as the salivary immunoglobulin 'A' test and the monitoring of speech pause time, magnetic resonance imaging (MRI), and computerized tomography (CT scanning), may provide a means to empirically assess and measure patients' responses to music therapy and add credibility to the music therapy profession. Researchers have monitored the effects of music therapy using peripheral temperatures, apical heart rates, blood pressure and heart rhythm (Bonny, 1978; Guzzetta, 1989), state-
trait inventories (Rider, 1990), electromyography (EMG) (Scartelli, 1984), electroencephalography (EEG) (Borling, 1981), galvanic skin resistance (GRS) (Peretti, 1983), and finger temperature (Kibler & Rider, 1983). Biofeedback equipment, sonograms and ultrasounds may prove useful to music therapists in acquiring data. There is greater potential for music therapists to measure the impact of their intervention given the increasing sophistication of medical equipment and tests used to evaluate, monitor and diagnose patients. The Salivary IgA test and the speech pause time measured by the Voxaflex, represent two of those sophisticated measures available that may provide music therapists with data that reflect the effects of their discipline.

Experimental Design

This study was conducted at Rainbow Babies and Childrens Hospital, a part of the University Hospitals of Cleveland. Subjects were 40 hospitalized children, ages 6-12 with a variety of diagnoses including seizure disorders, Kawasaki Disease, lead ingestion, brain tumors, cancer, fecal impaction and ruptured appendix. To participate subjects had to be in-patients and on no immunosuppressant drugs. Each child was given a verbal explanation of what would be expected of him and asked if he was willing to participate and written or verbal parental consent was obtained. Subjects were randomly assigned to an experimental group (Group A) who received 30 minutes of music therapy or control group (Group B) who received no music therapy
intervention. The pre/post test design involved the use of three measures:

1. A self-reporting 5-point Patient Opinion Likert scale (Appendix C), asking for subjects to tell how they felt by pointing to one of five faces on a page. Faces were graduated from very sad to very happy with number one being very sad and number five very happy. Subjects were asked "Point to the face that looks like you feel." The corresponding number under the face chosen was recorded.

2. A psychological measure, the monitoring of speech pause time (SPT), with an instrument called a voxaflex, which can be attached to a telephone receiver. SPT is the length of pauses between words and is thought by some researchers to be an indicator of mood, i.e., long pauses reflect greater depression, shorter pauses reflect less depression. Subjects were engaged in a 3-to 4-minute telephone conversation and scores displayed on the voxaflex were recorded both for the subject and therapist.

3. A physiological measure, the Salivary Immunoglobulin A test (IgA). Subjects were asked for 2cc's of their saliva and were given a small plastic vial on which the 2cc line was clearly marked. IgA is thought by some researchers to be an indicator of mood and to reflect some aspect of the immune system. Two different procedures can be used to obtain IgA samples. One involves directly stimulating the salivary gland inside the mouth with a canula, small straw-like object. This results in a purer sample than the other method. A second alternative, the one used in that study, is to have the subject expectorate
into a vial. The latter procedure may result in a sample that contains traces of food and mucosa in addition to the saliva. The debris found in the second sample can be separated from the saliva by spinning the sample in a centrifuge. To determine if the a single 30-minute music therapy session affects the IgA of hospitalized children in this study, a saliva sample was taken before and after music intervention. These measures are explained in the following section of this chapter.

Data was gathered from 40 subjects over a 5-month period, November 1989 through March 1990. All music intervention with the experimental group was conducted by the writer with each patient in his room. Treatment consisted of a series of music therapy activities that involved a hello song; singing; passing, playing and identifying instruments; imitation and listening games and a closure song. Music procedures are explained in detail in Chapter III. Subjects in the control group were allowed to continue for 30 minutes in whatever activity they were engaged at the time, however, attention was given to prevent any aversive intrusions such as injections, examinations by physicians or painful testing procedures. Some of the activities of Group B included writing, reading, drawing, watching television and playing Nintendo video games. Any participation in music related activities was avoided during the 30-minute testing time. The control subjects were given the pretest and posttests in the same order and manner as the experimental group, often with the help of another music therapist. Neither RMT remained with the control subjects during the
thirty minute period. However, music was offered to the child after the post tests and many accepted the offer with enthusiasm.

IgA samples were frozen and stored for batch analysis. Scores for SPT and the Likert scale were recorded and later tabulated for statistical testing.

**Dependent Variables**

As shown in Table 1, two of the tests obtained scores indirectly (IgA and speech pause time) and one measure was obtained by directly asking the patient to respond (Likert). One test represented a physical indicator (IgA), while the other two represented psychological indicators (speech pause time and Patient Opinion Likert Scale). In the opinion of the writer, obtaining all three types of data provides a more comprehensive picture of the effects of the treatment compared to focusing on one type of response.

**TABLE 1**

A COMPARISON OF PHYSIOLOGICAL, PSYCHOLOGICAL, DIRECT AND INDIRECT COMPONENTS OF IgA, SPEECH PAUSE TIME AND PATIENT OPINION LIKERT SCALE

<table>
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<th>IgA</th>
<th>SPT</th>
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<tr>
<td>Physical</td>
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<td>X</td>
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<tr>
<td>Psychological</td>
<td>X</td>
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Salivary IgA Test

The Salivary Immunoglobulin 'A' Test detects the amount of secretory IgA in saliva. Research suggests that IgA levels decrease significantly in the presence of stress. IgA protects mucosal membranes from invading organisms and plays an important role in mucosal defense against upper respiratory tract infections. Dillon, Minchoff and Baker (1985-86) found that salivary IgA levels in adults increased after watching a humorous videotape and did not increase after they viewed a didactic videotape. Furthermore, scores on a questionnaire used in this study, measuring the subject's perceived use of humor as a coping skill were positively related to initial IgA concentrations. Dillon, Minchoff and Baker conclude that “enhancement of the immune system may be one link between anecdotal claims of relationships between an individual’s being in a positive emotional state and healing.”

A study by Ursin, Mykeltun, Tonder, Vaernes, Telling, Isaken, and Murison (1984), demonstrated that changes in adults' blood immunoglobulin correlate with chronic stress. These researchers report others of their studies have resulted in similar findings. These findings appear to concur with the work of several other researchers. For example, the McClelland, Floor, Davidson and Saron (1980) study of 27 males showed that lower IgA concentrations were significantly associated with reports of more frequent illnesses. Irwin, Daniels, Bloom, Smith and Weiner (1987), suggest that life changes or stressors may result in negative effects on cell mediated immunity. Their data support the
concept of the importance of psychological factors in immunological function.

Two separate studies by Jemmott, Borysenko, McClelland, Chapman, Meyer, and Benson, 1983; and Kubitz, Peavy, and Moore, 1986, demonstrated that salivary secretory IgA in adults can be reduced in the presence of stress and/or decreased internal locus of control. Jemmott and Magloire (1988) found that those subjects who had greater social support relative to their needs had consistently higher IgA levels compared to other subjects. Similarly, according to Jemmott and Magloire, the antithesis may be true; that is, that lack of adequate social support may reduce IgA levels, subsequently resulting in the individual being more susceptible to infection. The study concluded that social support enhances health outcomes irrespective of whether the individual is exposed to stressful experiences. These findings are in direct agreement with the psychosocial goals and objectives of music therapy as a supportive therapeutic modality, and can pose special relevance to those who are hospitalized.

Stone, Jandorf, Cox and Neale (1987) studied IgA levels of 30 subjects in relation to daily fluctuations of mood and found that IgA response was lower on days with high negative mood relative to days with lower negative mood, and conversely, IgA was higher on days with high positive mood relative to days with lower positive mood. They concluded that the role of life's minor events in health may be mediated by the secretory immune system.
Olness, Culbert, and Uden (1988), in a randomized controlled study with 57 children, demonstrated a significant increase in IgA (p<.01) after teaching subjects self-hypnosis with specific suggestions for control of saliva immunoglobulins. Olness suggested that the increases in IgA levels were associated with some effect brought about by the subjects' volition.

The writer found only one research study that attempted to measure the response of the immune system to imagery, relaxation and music as measured by IgA and a mood check-list. Gordon and Tsao (1988) observed IgA increases (p< .07) after 100 subjects participated in an imagery and music treatment group. Research design included 5 randomly assigned treatment groups.

1. Control - These 20 subjects sat quietly in a room for 20 minutes

2. Imagery - This group listened to a directed imagery audio tape which instructed them to visualize their bone marrow, a primary source of white cell production. They were instructed specifically to visualize cleansing white blood cells radiating outward to various parts of their body.


4. Relaxation Only - Subjects were led in a relaxation routine via a progressive muscle relaxation audio tape

5. Music and Imagery Combined - This combined the Bonny tape and the imagery tape
Preliminary evidence showed a significant increase (p<.007) in immune response of 12 of the subjects in the music and imagery group. Five of the subjects in this group showed a decrease, and 3 showed no change. The control group data indicated that 13 subjects showed a decrease, 4 experienced no change, and 3 showed an increase. The remaining data at the time of the presentation of this study was not tabulated, but results imply that there is potential in positively affecting an immune response with the combined use of music and imagery.

Measuring the effects of music therapy using a physiological parameter such as salivary IgA can be an important indicator of the effects of music on the patient’s mood, and an excellent evaluative tool for the music therapist. It should be noted that not all researchers agree that IgA is a viable measure of the immune system (Stone, Cox, Valdimarsdottir, & Neale, 1987). However, it appears from the studies cited above, that salivary IgA can be used to measure change in mood and is positively affected by auditory and visual stimuli. Because music is an auditory stimulus and has been reported to trigger imagery (Bonny & Savary, 1973), reduce stress (Guzzetta, 1989) and improve mood (Bailey, 1984), it may be hypothesized that the effects of music could similarly be detected or evaluated in a salivary IgA sample of hospitalized subjects.

Speech Pause Time

Speech pause time (SPT), the silent time between phonations, is a direct correlate of mood; that is, longer SPT indicates more depression,
and shorter SPT indicates less depression. Szabadi, Bradshaw and Besson (1976) showed that the pause times of depressives decreased following treatment. Blackburn (1975) found that the SPT shortened with clinical intervention and antidepressant chemotherapy. Over a 2-month period he sampled the “automatic speech” (counting from 1 to 10) of four healthy adults, and for 4 to 6 months he sampled four moderately depressed adult psychiatric in-patients. He taped recorded and measured the phonation and pauses of each subject and later played them back through an oscilloscope to obtain a “voice-print.” Results showed that the healthy subjects' phonation times remained constant thoughout the 2-month period. The pause times of the depressed subjects were significantly longer while the subjects were depressed compared to pause times measured after recovery. Phonation times (actual speaking time) of these subjects remained constant throughout the observation period. In summary, as patients improved pause time shortened, reflecting a less depressed state. Other than drug therapy (100-150 mg Lentizol nocte, a form of amitriptyline hydrochloride) any additional treatment received by patients was not described in the study. Blackburn (1975) also reported the percentage reduction changes in SPT values were significantly correlated with percentage reduction in the depression scores (p<.05) following antidepressant chemotherapy treatment. In short SPT decreased as depression lessened with the use of antidepressants.

The voxaflex, an instrument that measures SPT, was invented by Cleveland psychiatrist, Ernest Friedman. It is nonintrusive, the size of a
small answering machine and has no extraneous apparatus that must be attached to the patient. It attaches to the receiver of a telephone and records the SPT in monologue or dialogue mode, making it possible for one or two person's SPT to be measured concurrently. After three minutes of a subject's continued speech, the voxaflex records the pause time and gives a color coded three digit reading. To determine if a single 30-minute music therapy session affects the speech pattern of the hospitalized children in this study, a SPT sample was taken before and after music intervention, or in the case of the control group, no intervention. Information about the psychological effects of a single music therapy session as measured by SPT, would provide useful and perhaps encouraging feedback that could be beneficial in the patient's recovery process. For the music therapist this data could provide needed research and yet another means of evaluating the impact of music therapy on patients.

Patient Opinion Likert Scale

To supplement the aforementioned tests the writer developed a 5-point Patient Opinion Likert Scale. Its purpose was to obtain information from the child about how he felt before and after intervention or non-intervention. It consisted of five numbered “smiley faces” ranging from very sad to very happy, “one” being the saddest and “five” indicating the happiest. An illustration of this scale is presented in Appendix C. Each subject was asked before and after intervention to "Point to the face that looks like you feel." This provided subjective,
patient-reported information for analysis. This measure could provide the patient with a visible representation of the change in his mood, which might otherwise go unnoticed. This data would provide the music therapist an indication from the patients’s perspective whether the music therapy procedures were “working” and allow the RMT to continue or modify treatment.

Null Hypotheses

Four hypotheses were formulated for each of the three variables. The writer was looking to determine if there were differences between the pretests and posttests of each variable. This would indicate if the 30-minute intervention or nonintervention had any impact on the salivary IgA, the speech pause time or the child’s subjective opinion. The first null hypothesis stated that there would be no difference in the pretest and posttest of the experimental group or the pretest and posttest of the control group. An alternate hypothesis stated that there would be a significant difference in the treatment and nontreatment groups’ pretest and posttest. The second hypothesis stated that there would be no statistical significance between the difference of the pre-tests or posttest changes in either the experimental or control groups. The alternate hypothesis for this stated that there would be a significant difference in the change. The twelve hypotheses are listed below.

1. Null Hypothesis: The pretest and posttest IgA scores of those who participate in a 30-minute music therapy session and the
pretest and posttest scores of those who do not receive music are not significantly different.

2. Alternate Hypothesis: The pretest and posttest IgA scores of those who participate in a 30-minute music therapy session and the pretest and posttest scores of those who do not receive music are significantly different.

3. Null Hypothesis: There is no significant difference in the change between the experimental and control group IgA scores.

4. Alternate Hypothesis: There is significant difference in the change between the experimental and control group IgA scores.

5. Null Hypothesis: The pretest and posttest speech pause time scores of those who participate in a 30-minute music therapy session and the pretest and posttest scores of those who do not receive music are not significantly different.

6. Alternate Hypothesis: The pretest and posttest speech pause time scores of those who participate in a 30-minute music therapy session and the pretest and posttest speech time scores of those who do not receive music are significantly different.

7. Null Hypothesis: There is no significant difference in the change between the experimental and control group speech pause time scores.

8. Alternate Hypothesis: There is significant difference in the change between the experimental and control group speech pause time scores.
9. Null Hypothesis: The pretest and posttest Likert scores of those who participate in a 30-minute music therapy session and the pretest and posttest scores of those who do not receive music are not significantly different.

10. Alternate Hypothesis: The pretest and posttest Likert scores of those who participate in a 30-minute music therapy session and the pretest and posttest scores of those who do not receive music are significantly different.

11. Null Hypothesis. There is no significant difference in the change between the experimental and control group Likert scores.

12. Alternate Hypothesis: There is significant difference in the change between the experimental and control group Likert scores.

Primary Assumptions for This Study

This research was based upon the following assumptions:

1. The measures were reliable and valid. Stability of the measures as well as the degree to which they measure what they purport was important in order to maintain acceptable research standards.

2. The three measures would be perceived by the children as nonanxiety-producing and would reflect an unbiased response before and after treatment (or no treatment). Both of these assumptions were essential to the purpose of this study.

Chapter II of this dissertation is a literature review of the research on music and its role in the health care setting. The two categories of music reviewed in this chapter are the effects of music on
the perception of pain and music's effect on physical and psychological stress. Chapter III discusses in detail the research design and procedures used for the treatment and control groups. The statistical results of each of the pretest and posttest measures with corresponding tables appear in Chapter IV. Finally, a review of the purpose of the study, discussion and implications for future research are presented in Chapter V.
CHAPTER II

RESEARCH ON MUSIC AND MEDICINE

There is a diversity of approaches to the study of music and medicine, ranging from the analytical, rational approach that relies on behavioral and experimental techniques to the esoteric, transpersonal and existential type with its more intuitive, subjective approach. Clinically these types need not be mutually exclusive. It is important to establish credibility with empirical data, but not to the exclusion of the subjectivity and interpersonal relationships that give music therapy a distinct advantage over a purely medical or empirical model. To synthesize these approaches would be ideal.

This chapter focuses on reviewing the literature on two uses of music in a hospital setting. First, the literature on the effects of music on pain perception is reviewed. This section includes some of the research on audioanalgesia (a blend of music and white noise), guided imagery and music. Secondly, the literature on music and its effect on relaxation and stress is examined. Under this heading appear studies on the psychosocial responses of hospitalized patients to music and how music therapy is being incorporated with dying patients. These two areas were chosen for review because the researcher identified pain control and the need for stress reduction as common issues of concern for her patients. Another reason was that the majority of the music and health literature focused on these areas.
Music and Pain Perception

Pain is defined in this dissertation as unpleasant or distressing sensation due to bodily injury, disorder, acute mental or emotional distress, or suffering. Its origins are both physical and emotional. This fact is evident in the diverse approaches to research studies on music’s affect on pain.

Jane Standley (1986) states several possible reasons why music appears to lessen the perception of pain:

1. Auditory stimulation occupies some of the neurological pathways of the brain and may prevent the neurotransmitters from sending pain messages to the brain.

2. Music may reduce tension during dental procedures by masking the sound of the drill which some patients find unsettling.

3. Pain perception may be reduced by relaxing the body. Less rigidity in the muscles allows better oxygen and blood flow and allows the body to experience a sense of calm. Music may facilitate the relaxation of the body.

4. Music may reduce pain through distraction, that is by focusing the mind away from the pain toward a more pleasurable stimulus.

5. The sense of helplessness can be reduced when a patient is given some music which allows increased control over an invasive situation.
As advances are made in research on the brain and hemispheric differentiation, scientists are finding that music affects the brain at least in two ways:

1. Music can move through the auditory cortex directly to the limbic system, which is the regulating center of emotional responses. This area constitutes the most primitive part of the brain.

2. Sedative music may stimulate the release of hormones such as endorphins which in turn act on specific brain receptors and neurotransmitters to alleviate pain (Clynes, 1982; Goldstein, 1980).

Harvey (1987) explains the process of sound vibrations in the human body as follows:

Sound vibrations are channeled through the ear as well as skin and bone conduction, and are processed in the brain stem (reticular activating system), and neural impulses trigger autonomic nervous system reactions, which in turn produce changes in respiration, pulse rate, blood pressure, muscle tone, brainwave frequency, galvanic skin response, pilomotor reflexes, pupillary reflexes, gastric motility, etc., etc...1987 (p. 80).

Some of the first research on pain reported by Davidson (1899) describes the benefits of piano music in a hospital ward. He found that 7 out of 10 fevers were reduced and pain was markedly diminished or eliminated entirely. Davidson also reported using Chopin waltzes in the cure for a child with insomnia, flute music for another child of the same diagnosis and, similarly, harp music was used to reduce a fever that had been persistent for 18 days.
Davison (1899) contended that the human organism vibrates synchronously with music and that music circumvents the body’s nervous centers. Music then influences the body without conscious effort. His technique included musically matching the person’s mood and gradually bringing him to a healthier frame of mind. Davidson claimed that disease emits painful vibrations and that an important procedure in restoring a patient to physical health was to replace these with pleasant musical vibrations. In a bold and most prophetic statement, he expressed his conviction in the power of music to impact physiological gains and described how music therapy might eventually work hand in hand with medicine: “Pharmacological therapeutics will not lose any of their efficacy in the treatment of disease when, side by side, mental therapeutics in the form of music....pursue the same end” p. 1162).

Goloff (1981) used a questionnaire to determine attitudinal and emotional responses of 49 hospitalized subjects to group music therapy. Music therapy sessions were one hour long twice each week for 9 months. Participation was voluntary, group members fluctuated weekly and the group size varied from 3 to 15, with a mean of 8 participants. Patients ranged in age from 21 to 82 years with diverse diagnoses, including neurologic and pulmonary disorders, physical rehabilitation, minor surgery, burns, brain tumors, amputation, paralysis and cancer. Sessions consisted of singing, instrumental acitvities, musical and verbal exploration of feelings and group improvisation. Patients completed the questionnaire before and after the session. Topics covered on
questionnaire focused on four areas: physical discomfort, affective state, subjective response to music therapy and feelings about the hospital. Results demonstrated the following:

1. Physical Discomfort: Music therapy reduced self-perceived discomfort (p< .05)

2. Affective State: Subjects rated themselves on six mood parameters: cheerful, sad, grouchy, lonely, scared, and satisfied. All six moods changed positively and four achieved statistical significance: cheerful (p< .01), sad (p<.01), lonely (p< .01), satisfied (p< .001).

3. Subjective Response to Music Therapy: Posttest questions assessed how patients liked music therapy, if they looked forward to returning to music, and how helpful music therapy was in comparison to other available therapies.

Responses indicated that 74% rated music therapy "very enjoyable" and 24% found it "somewhat enjoyable". Similarly, 74% "definitely" looked forward to returning to music and 20% "probably" looked forward to returning. Only one subject reported any negative feelings about the session. From a list of seven choices the response percentages for patient assessment of helpfulness of hospital activities, ranked visitors and music therapy first and second respectively.

4. Feelings About Being In The Hospital: Twenty-four percent of the pretest responses characterized their hospitalization as "somewhat unpleasant" or "very
unpleasant” and 72% felt it was “somewhat pleasant” or “very pleasant.”

Remaining responses were neutral. Posttest responses showed that 71% of those who had previously characterized their hospitalization as unpleasant felt that the music therapy made the hospital stay “a little better” or “much better” while 20% indicated that their feelings had not been affected. Goloff suggests from these findings that there is genuine promise for the use of music therapy in a medical setting to benefit the physical, recreational and emotional needs of patients.

Godley (1987), a music therapist working in a pain rehabilitation clinic, observed a decrease in the use of medications in 70% of the patients using music and guided imagery. When experiencing high levels of pain at the onset of individual sessions, Godley’s patients often stated that their pain was less or nonexistent at the session’s end. Similarly, the patients claimed that music helped them to more deeply relax and to produce and guide their own imagery.

Godley’s use of biofeedback equipment in her work gave her patient the added benefit of auditory and visual information and provided her with a means of evaluating their progress. In a typical session, electrodes were applied to various muscles, usually the frontalis muscle, which is an indicator of over-all autonomic-skeletal muscle arousal, and various other muscles on the neck and forearm. A sensor was placed on the index finger of the right hand to monitor heart rate, and bilateral dermal temperature electrodes were positioned on the middle fingers. An increase in temperature indicated a reduction in
sympathetic arousal that in increased blood flow and relaxed muscles. To discourage dependency upon the biofeedback equipment, the use of this machinery was faded usually after the third session and the patient was taught to rely on his own ability to detect and affect physiological change.

Godley and the patient wore headphones during sessions. After speaking softly into a microphone and directing the patient to relax, Godley introduced pink sound, which faded eventually into music. The volume of the therapist’s voice was adjusted to resemble a faint echo chamber heard only in the left ear. The purpose of this process was to attempt to circumvent rationalization, a characteristic of the left brain hemisphere. The left ear has more neural connections to the right hemisphere of the brain. Godley made a series of statements, i.e., “easier and easier to relax,” “the mind controlling the body,” “increased control of the physiology,” “every day feeling better and better,” and “mind, body, balance.” These were said rhythmically and in synchrony with the music. After approximately 5 minutes, the patient was told to slowly awaken. Music and pink noise were phased in and out respectively and the patient was left with the suggestion to allow this relaxed state to continue throughout the day. Sessions lasted from 40 to 60 minutes, ending with a discussion of the sensations, images and feelings the patient experienced and goals to work toward. The patient was given a taped copy of the session for practice purposes during the week.
Godley reported that after 10 sessions 75% of the patients experienced a decrease in EMG levels on monitored muscle sites and added that though these results appear to indicate positive results that there is unsubstantiated data to support her findings. Her treatment goals included teaching patients to control their physiological responses; recognize precipitating events leading to pain; to recognize and know his/her body, mind and behavioral patterns associated with pain behaviors; and to generalize newly learned skills to his/her every day environment. Interestingly Godley’s patients used the music/imagery techniques when they felt tension during daily activities and learned to hear the music in their heads and would subsequently feel their bodies relax. Godley suggests the reason for positive results may be that through music, relaxation and imagery, the processes of the right hemisphere of the brain are strengthened. This in turn strengthens the immune system. She adds that when attitudes and feelings are positively effected this may produce optimism and increased interaction with others.

Music therapist Mark Rider (1985) studied the effect of different types of music-mediated imagery on pain reduction, EMG tension reduction, and imagery vividness and activity in a group of 23 spinal pain patients. Treatment consisted of listening through headphones to one of seven tapes. The first 5 tapes contained 9 minutes of relaxation and guided imagery instruction followed by music. These selections were characterized as (1) “active minimalist music,” (trance-like, habituating) Steve Reich’s “Music for Mallets, Voices and Organ” ; (2)
“inactive minimalist music,” synthesized composition on Roland Guitar simulating crystal goblets; (3) impressionistic music by Debussy; (4) the jazz of Pat Metheny; (5) entrainment music, containing synthesized and acoustic guitar. The latter selection exhibited a definite climax or mood shift from unpleasant to pleasant while the other pieces were highly repetitive and did not. (Entrainment music is defined as music that results in prevalent mood shifts from tension to relaxation.) The two other tapes were patient-preferred music and a no music control with 20 minutes of muscle relaxation/pain relief imagery.

Rider measured five dependent variables: pain (pre/post test), EMG (pre/post), imagery vividness (posttest), imagery activity (posttest), and music preference (posttest). In all but the EMG, data was self-reported on questionnaires. He found that all tapes produced significant results for reducing pain; EMG levels were lowered by all tapes except the Reich and Debussy; and entrainment music resulted in the most significant effectiveness in reducing pain and EMG levels. Rider noted that the two most effective conditions for pain, entrainment and Reich, were the least preferred music types.

Oncology patients were found to report that music changed their awareness of pain for the better in a study conducted by Bailey (1983b), music therapist at Sloan Kettering Memorial Hospital. Bailey assessed the patient’s mood and needs, general level of pain through questioning and observation. By reviewing with the patient and/or family the patient’s prior experiences with music, preferences, musical skills and abilities, Bailey formulated music therapy experiences tailored made for
each individual. Her goals were to promote comfort and help the patient integrate prior experiences and current abilities into pleasurable musical experiences. Bailey found that her patients usually fell into one of three categories:

1. **Music performer:** a patient that has actively experienced making music, e.g. played an instrument, sung in a choir, composed music.

2. **Music listener:** one whose involvement with music is mainly with the radio, a stereo or attending concerts.

3. **Music "event-er":** one who associates and experiences music primarily around specific occasion, e.g., weddings, parties, holidays, trips.

Bailey found that initially matching the mood of the patient with appropriate music can be beneficial. This is followed by progressively leading the patient into a more desirable state with different music.

In a study with 50 cancer patients Bailey (1983a) found that live music is more effective in relieving tension and promoting vigor than taped music. Patients ranging in age from 17 to 69 years listened to 25 minutes of live music singing and guitar playing or to taped versions of the same material. Data consisted of two pre/post questionnaires: Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971) and the author's Summary Questionnaire. Buros (1978) describes POMS as a standardized questionnaire having reliability, validity and internal consistency. Scores of those subjects listening to live music reflected more changes in physical discomfort (p<.05), changes in mood (p<.01),
and changes in mood for the better (p<.001). More tension was reported by the taped music group than by the live music group and more post-music vigor was reported by the live music group. Bailey stressed that the human element inherent in live music is a most important factor and that the human voice and guitar could diminish a patient's feeling of isolation and thus bring about a positive mood affect.

Bolger and Judson (1984) reported a brief case study of a 78-year-old woman with dementia and chronic obstructive pulmonary disease. The results of this study demonstrated as in the Bailey study how live singing affected the physiological state of a patient. The patient had extubated herself while recovering and because of her declining mental status was unable to follow verbal commands necessary for her treatment, especially to cough or to deep breathe. Staff became aware that this patient was echolalic (would repeat words spoken to her). When the staff sang to the patient she "vociferously" sang along such songs as "Twinkle, Twinkle Little Star;" "Hi Ho, Hi Ho, It's Off to Work We Go;" and "You Must Have Been a Beautiful Baby." As the patient sang she automatically took deep breaths, began to cough and expectorate substantial amounts of sputum. This resulted in improved arterial blood gas levels, as well as her emotional and clinical status. Bolger and Judson cite the following benefits of singing for selected patients:

1. During singing, up to 90% of the vital capacity may be used without a conscious effort to increase tidal volume.
2. The patient can attain his or her total lung capacity, which can help to minimize atelectasis and may stimulate or increase the force of the cough reflex.

Studies on music therapy-assisted labor and delivery and the effects of music and imagery on analogued labor pain have reported differing results. Clark, McCorkle and Williams (1981) reported that 13 patients listened to prerecorded music throughout labor and delivery and in response to a questionnaire indicated subjective perceptions and recollections of their labor/delivery experience. The questionnaire also asked for information regarding the frequency and duration of home practice. Results showed a moderate correlation between music home practice and successful childbirth outcome.

Geden, Lower, Beattie and Beck (1989) simulated labor pain by using a pain stimulator with 50 women who had never given birth. A plexiglass wedge attached to a weighted transducer to the subject's left index finger produced continuous and uniform pressure. There were no significant differences found among those who listened to rock music, self-selected music or a placebo and subjects in a no-treatment group. No explanation was given regarding justification or validity for the method of pain simulation. Therefore, how applicable the results are to actual experienced labor pain cannot be determined. A number of other possibilities for using music to lessen the impact of pain have been explored as seen in the following overview about audioanalgesia.

In summary the literature states that music may reduce pain perception by occupying neurological pathways of the brain and
preventing them from transmitting pain messages. Music also seems to stimulate the release of endorphines and other hormones which are the bodies natural pain killers. Researchers are also studying the effects of combining music with biofeedback, guided imagery and relaxation techniques.

Audioanalgesia

This section describes some studies that use music as an analgesic in the treatment of pain. Gardner, Licklider and Weisz (1960) studied the application of sound and music as an audio analgesia in dental surgery. Audio analgesia is the use of auditory stimulus to suppress, eliminate or significantly reduce pain perception. In some studies audio analgesia is a blend of music and white noise. White noise, sometimes referred to as pink sound (Godley, 1987), is a combination of synthetically produced frequencies that resemble the sound of ocean waves, a waterfall, or rushing wind. Gardner, Licklider and Weisz reported that the function of the white noise appears to be to drown out the pain while the role of the music seems to be to relax the patient. Their study that involved the patients of eight Boston dentists reported that during 90% of 5000 dental surgeries no anesthesia was required when audio analgesia was used. Gardner, a dentist, reported having performed over 200 extractions using only audio analgesia and documented that in 65% of 1000 patients, supression of pain by sound was successful. These same patients had required anesthetic in previous dental operations. Patients wore headphones and controlled the stimuli
with a small, hand-held box. Music and noise were controlled separately. Before any painful procedure began the patient listened to stereophonic music. When he anticipated or felt pain he increased the intensity of the noise stimulus. Gardner, Licklider and Weisz believed this method gave control to the patient thereby lessening anxiety. The music could only be followed through concentration, which also helped to divert the patient's attention and promote relaxation. During cavity preparation. The sound of the drill was blocked out, which also lessened tension. Gardner, Licklider and Weisz admit that suggestion plays a significant role in this procedure, but cannot estimate the degree to which suggestion is important. Patient and dentist communication is enhanced in this method through a signal indicating the intensity level of the music and the noise. This alerts the dentist to the patient's state of discomfort or anxiety.

In the same study Gardner, Licklider and Weisz add that audio analgesia is more effective against some kinds of pain than others. They write that other physicians reported success in using audio analgesia with pain sources that included left heart catheterizations, removal of toenails, labor and childbirth, and removal of a shoulder polyp. They attribute the suppressive effect and the sense of relaxation to the reduction in the number of pain relays to which the auditory system has access.

Another study showed that white noise had no analgesic effect on viseral pain. Moore, Browne and Hill (1964), tested pain threshold effects under four conditions: (A) control; (B) music alone; (C) white
sound of moderate intensity - 90 db; (D) white sound of maximum intensity - 120 db. Their results indicated that sound stimulation did not significantly alter pain threshold. Twelve subjects were exposed to the pain produced by a sphygmomanometer cuff applied to the subject’s arm. It was inflated to 250 mm Hg, cutting off all circulation in the arm. Each subject formed a fist around the bulb of a manometer and rhythmically squeezed it repeatedly. The resulting pain this squeezing produced progressed in three stages, from vague unpleasant sensations to more definitive pain to a sudden, severe, arresting pain. The effects of listening with earphones under the three conditions were measured from the time when blood circulation to the arm stopped to the point of onset of the sudden, severe pain. There were no significant differences between treatments. Moore, Browne and Hill state that this study dealt with visceral or deep pain, different in quality from cutaneous or superficial pain. However, the effects of analgesia upon both types of pain are similar. The results of this study concluded that sound stimulation does not alter the threshold of pain produced by the contraction of ischaemic muscle.

Melnechuk (1985) reports that in preliminary studies by Ralph Spintge in West Germany, patients having dental surgery self-selected music to induce analgesia. Results showed blood levels of stress hormone adrenocorticotropic hormone (ACTH) were reduced and levels of beta-endorphin (one of the body’s natural opioids) increased. No specific details of the study were cited. Melnechuk summarizes his
opinion regarding how positive emotions and music might affect physical health with this speculation:

...the positive emotions aroused in the left hemisphere by appropriate music may increase the activity of opioids that help to ensure the optimum level of immune responsiveness in lymphocytes. This optimal level, neither so weak as to permit tumors and infections nor so strong as to permit allergies and auto-immune disorders, helps to keep us in good health...It does not seem too farfetched to suppose that immune responsiveness can be modulated toward optimal levels by the positive emotions aroused by the music we enjoy (p. 57).

In summary, audioanalgesia has been shown to reduce the effects of cutaneous, superficial and simulated pain. Blood levels of stress hormones and beta-endorphin have been reported to be reduced with the use of audioanalgesia, and the emotional arousal caused by listening to music is thought to play a role in the effect of music on pain perception.

The Use of Guided Imagery, Visualization and Music

Health professionals outside of the music therapy field have explored the subjects of music, imagery and health. Psychologists Simonton and Simonton (1978), Achterberg and Lawlis (1984) and Seigel (1986) a surgeon and founder of Exceptional Cancer Patients (ECaP), describe the use of imagery in the treatment of pain and side effects of treatment with oncology patients. Some references include the use of music in conjunction with imagery. Seigel’s major focus in supporting these patients and promoting positive changes in the body is through the emotions and imagery. He recommends a regime of eating a proper diet, responsibly resolving latent issues, aggressively
confronting treatment options, and using visualization daily. Seigel sees visualization as a means of taking advantage of what he terms a weakness of the body, that is, the body cannot distinguish between a vivid mental experience and an actual physical experience. Seigel’s patient’s visualize themselves not only getting better but specifically empowering their immune systems. Seigel says that music helps the patients to relax by setting the mood for relaxation to occur and by synchronizing the heart beat and producing alpha brain waves, the kind present when the body is in a relaxed state. Seigel recommends Pachelbel’s Canon (recorded by Daniel Kobialka) as being especially relaxing. Most of Seigel’s writing about the positive and often dramatic effects experienced by his patients is anecdotal. His book, *Love, Medicine and Miracles* (1986) offers guidelines and relays his observations regarding the profile of a cancer survivor but gives no empirical data.

Psychologists Achterberg and Lawlis, psychologists Stephanie and Carl Simonton as well as Seigel produced cassette tapes to be used in the visualization process. A transcript of Achterberg’s tape begins with relaxation and describes healing images such as picturing oneself healthy, productive and disease-free, and imaging the immune system as extremely powerful and the white blood cells attacking and destroying abnormal cancer cells. These tapes are for daily therapeutic use while others are educational in nature, instructing the patient about the disease, treatment and the immune system. The role of music seems to
be to enhance the visualization and imagery process by promoting relaxation.

The effects of music therapy and guided visual imagery on the degree of chemotherapy induced nausea and vomiting were studied by Frank (1985). Fifteen cancer patients received their usual pharmacological antiemetics and cassette tapes and visual imagery during and after their chemotherapy treatments. Data as measured by the Spielberger State-Trait Anxiety Inventory (STAI) showed that state anxiety was significantly reduced (p<.001) and that there was a negative correlation between the length of exposure to the music and anxiety scores. The perceived degree and length of nausea and vomiting patterns were evaluated by a researcher developed Nausea and Vomiting Questionnaire. Findings showed that the length of time nausea was experienced decreased though it was not statistically significant. However, the patients' perceived degree of vomiting was significantly reduced (p<.05). Frank admitted that one of the study's limitations was the test-retest design of the STAI within a 2-hour period. Administration of this test before the music intervention may have sensitized the patients to issues about their anxiety levels they had not previously considered. The nausea and vomiting questionnaire also was not tested for reliability or validity. However, Frank points out that these findings imply that music therapy and guided visual imagery in conjunction with pharmacological antiemetics are beneficial to patients and suggests that this may have further implications in other high anxiety producing situations in hospital settings.
The rhythm of respiration tends to adapt itself to the rhythm of the music, especially when the music gradually decreases in tempo (Diserens & Fine, 1939). Perhaps this offers some explanation as to why 60-beat-per-minute music seems to lessen muscle tension and facilitate relaxation. Attention is to be given to patient preferences for music, however. Stratton and Zalanowski (1984) investigated the relationship between music, degree of liking and self-reported relaxation and found that the most important factor in relaxation was the degree of liking for the music. Thirty-six college students were assigned to one of six groups, five heard music and one group sat in silence. Subjects were tested individually for 15 minutes while listening to one of five tapes: 1. soothing classical, 2. stimulating classical, 3. romantic, 4. atonal, or 5. Muzak. A questionnaire asked subjects to rate how pleasurable the experience was, how relaxed they felt and how much they liked the music. Significant difference (p<.05) and a high positive correlation were found between the degree to which the subjects liked the music and perceived relaxation. No single type of music was more effective than others in promoting relaxation nor was there any significant difference between soothing and stimulating music. Stratton and Zalanowski report that their findings were consistent with those of Smith and Morris who found that liking of the music correlated positively with performance, concentration and negatively with worry and emotionality (Smith & Morris study cited in Stratton & Zalanowski, 1984).
In summary, music has been reported to have significant effects on pain perception. Research attests to its use with a diverse patient population for diversion, enhancing visualization, inducing the relaxation response, lowering heart rate and blood pressure, and appreciably reducing pain. There appears to be both clinical and observational evidence that merit its use as a prophylactic and active treatment modality.

The Influence of Music on Relaxation and Stress Reduction

To what extent can music affect the human nervous system? Will specific kinds of music affect specific kinds of changes? What psychological changes in patient and staff behavior can be affected by music in a hospital? This section reviews some of the literature that addresses these questions.

A study comparing the effects of two different kinds of relaxation music on tension level during a 20-minute training session was attempted using the music of Steven Halpern, “superlearning” music, and no music (Logan & Roberts, 1984). Halpern promotes his music as “anti-frantic” and capable of inducing a state of relaxation. Superlearning music is promoted and distributed by Superlearning Corporation and is typically baroque in nature, with homophonic string instrumentation. It is said to enhance one’s learning capacity as well as induce relaxation. The dependent variable in this study was the subject’s tensions level as measured on a self-reporting 10-point anchoring scale. The 25 subjects were assigned to one of the three groups and over the
nine different time periods showed no significant differences between treatment conditions. During the third and fourth listening periods it was noted the group listening to Halpern's music had significantly higher tension levels (p<.05) than did the group not listening to music. Though Logan and Roberts do not venture a reason for this finding, they do state that is unlikely that Halpern’s music actually increased the subjects’ tension levels, since the group listening to the superlearning music did not differ in subjective tension level.

Davis and Thaut (1989) studied the physiological and psychological responses of 18 subjects to preferred, relaxing music. Physiological data included vascular constriction, heart rate, muscle tension and finger skin temperature. The Ptielberger State Anxiety Inventory and a 7-point Likert-type scale for self-rated relaxation comprised the psychological data. Results indicated that state anxiety decreased (p<.05) and relaxation increased though not significantly. These two findings were inversely related. Interestingly physiological data revealed that the music aroused and excited the subjects rather than soothing autonomic and muscular activity. Davis and Thaut stated that this provided evidence for the "existence of idiosyncratic physiological responses within subjects." This study also stressed the importance of the listener's musical preferences in determining the behavioral effects of music.

Helen Bonny, founder of the Institute for Consciousness and Music, designed a set of five audio tapes, Music Rx, for hospital use. Two tapes are for use in the Intensive Care Units, two for the operating
room and one for use in the recovery room. She states that the musical programs function as stress, pain and anxiety reducers and can be used in conjunction with medication or as a replacement when medication is contraindicated. Music Rx is a result of 20 years of research by Bonny and utilizes the music of classical composers Bach, Haydn, Tchaikovsky, Mendelssohn, Vivaldi, Respighi, Walton, Vaughn-Williams, Dvorak, Debussy, Bizet, Britten as well as the more contemporary music of Cat Stevens, John Denver, Willie Nelson and Nat King Cole.

During two 6-month-long studies by Bonny (1978) at Jefferson General Hospital in Port Townsend, Washington, and St. Agnes Hospital in Baltimore, Maryland, Bonny’s tapes were tested on both nurses and patients in the intensive care units. Results revealed a reduction of heart rate after patients listened to the taped music as well as positive effects on depression, anxiety and pain. Nurses observed that patients had lower blood pressure and pulse readings, and for some it evoked more regular deep breathing, relaxed muscles and sleep. Results of the study also indicated that patients had a greater tolerance for pain. Nurses reported that when the patients used headsets it was easier to transfer and position patients, to change intravenous needles and to place patients on a respirator.

Rider, Floyd and Kirkpatrick (1985) examined the effect of music guided imagery (GI), and progressive muscle relaxation (PMR) on adrenal corticosteroids, commonly known as the “stress hormones.” Continued exposure to these stress hormones over time can be injurious to the immune system. Corticosteroid levels are usually elevated during
depression and emotional stress, while the amplitude of the curve of urinary corticosteroids "flattens out" in lower-anxiety subjects. Twelve subjects used a 20-minute taped induction of music/PMR/GI five times each week for three weeks. Urinary corticosteroids, body temperature and circadian amplitude were used as evaluative measures. Results showed a significant amplitude reduction during treatment. Rider, Floyd and Kirkpatrick conclude that there is a close relationship between music/relaxation techniques and physical health and suggest the following:

The implication of this study for music therapy clinicians is that a technique exists using music listening to alter body chemistry in positive directions. Such chronic diseases as the autoimmune syndromes and cancer, as well as the more acute viral infections, need to be studied to determine their responsivity to such techniques. The stress-reducing properties of music, progressive muscle relaxation, and guided imagery have more obvious implications for use in mental health and educational settings. Further research should investigate the complete role of music in facilitating imagery and relaxation and should attempt to determine which of the three components is most important to general health. (p. 56).

Guzzetta (1989) studied the effects of relaxation and music therapy on patients in a coronary care unit with presumptive acute myocardial infarction. The 80 hospitalized subjects were randomly assigned as follows: 27 to a control group, 26 to a music therapy group, and 27 to a relaxation group. The music therapy intervention consisted of a relaxation induction and listening to a 20-minute cassette tape chosen by the patient. Like other researchers, Guzzetta maintains
that patients' musical preference is important, therefore. Therefore, subjects were asked to choose from one of three 'soothing' tapes - classical, popular or nontraditional. These patients practiced for 20 minutes twice a day for a total of three sessions over a 2-day period. Data consisted of pretest-posttest apical heart rates and peripheral finger temperatures and showed that the relaxation and music therapy were more effective than no intervention in lowering heart rates. Finger temperature data showed that the music therapy was more effective than the relaxation alone. Guzzetta recommends that nurses learn and incorporate relaxation and music therapy techniques to enhance their practice and assist their patients in their psychophysiological recovery.

Producers of environmental music programs (Muzak) conducted a study in Creighton University's St. Joseph Hospital (n.d.). They installed their music system in an effort to reduce stress in preoperative patients. Subjects were 155 males and 131 females. Patients were randomly assigned to two groups, one that heard Muzak and one that did not. Over several months blood pressure, pulse and respiration rates as well as observed behavioral indicators of emotion were monitored. Results indicated that patients who listened to Muzak showed reduced blood pressure by 1.1%; lower pulse rate by 1.1%; reduced respiration rate by 3%; reduced anxious behavior (fidgeting, depression) and increased calmness. These patients reported they experienced lower anxiety levels. Pulse rate was .1% faster with Muzak. No date or specific research design details were given in the study.
In summary, music has been reported to have a positive effect on physiological and psychological stress as demonstrated by reduced blood pressure, respiration, heart rate, and patient self-reporting. The effects of relaxation techniques appear to be enhanced when coupled with music.

**The Influence of Music on the Autonomic Nervous System and the Emotions**

Some composers have written music with the specific intent to evoke the relaxation response by a lowering heart rate and by promoting regular, deep breathing, which prepare the body for sleep. Composers Steven Halpern, Don Campbell, Daniel Kolbalka and others utilize synthesizers and acoustic instruments to create music especially for use in conjunction with alleviating and reducing the perception of pain and enhancing health. Halpern (1985) states that just as there are sounds that contribute to our health, there are sounds and music that may contribute to stress, tension, headache, nausea, hearing loss, disturbed sleep, poor digestion, irritability, lack of concentration and hyperactivity. He continues by asserting that public conciousness is being raised and people “are learning how to choose and create music to facilitate such things as relaxation, concentration, learning, creativity, meditation, muscle response, digestion, mood change, psychotherapy, and self-healing” (p. 9).

Sedative music is reported to decrease heart rate, vary blood pressure and may lessen pain perception. Definitions of what constitutes quieting, calming music vary. Gaston (1951) describes sedative music as
“music characterized by a regular rhythm, predictable dynamics, consonance of harmony, and recognized instrumental and vocal timbre” (p. 43). On the other hand Logan and Roberts (1984) criticize the advertised ‘anti-frantic’ music of new age composer Steven Halpern as “contemporary in its use of electric piano and synthesized strings, improvisation within bizarre modal scales, and lack of resolution typical of traditional diatonic music.” Previous exposure and culture as well as personal preference and age also become factors in the perception of what one considers calming or sedative (Godley, 1987). Peretti (1983) similarly indicates that one’s musical preference is a major variable to consider in the prediction of relaxation/arousal responses to music.

Updike and Charles (1987) investigated the physiological and emotional responses of 10 patients to one of Bonny’s 30-minute Music Rx tapes. Each patient was his own control. These patients, awaiting an elective plastic surgery procedure, responded to open-ended, nondirective questionnaires that focused on such areas as depression, sadness, despair and pain. Results showed that, after 30 minutes of listening to one of five taped programs of classical or contemporary music, every physiological variable decreased significantly (p >.001). Variables included systolic and diastolic pressure, mean arterial pressure, and double product index. The most significant emotional effect appeared to be an experienced shift in patients’ awareness toward a more relaxed, calm state. Updike and Charles note that the interactive effect of human presence in addition to the music was not accounted for and is a matter for further research.
In another study, Updike (1990) investigated the physiological and psychological responses of 20 coronary and surgical intensive care patients who listened to 30 minutes of one of eight tapes (Music Rx by Bonny). Pre/post data showed a significant reduction (p<.01) in systolic blood pressure, mean arterial pressure (MAP) and double product index (DPI). Updike also reported significant findings in reduction of pain, although no significance level for this reduction was given. Psychologically all patients reported feeling more calm, relaxed or comforted. Five open-ended questions comprised the psychological evaluation tool: 1) How are you feeling today (emotionally)? 2) Are you feeling alone? 3) Are you feeling nervous or worried? 4) How do you feel about the care you are receiving? 5) Are you in pain? Physiological data included heart rate, blood pressure, MAP, DPI and EKG. Pain medication dosage was also monitored.

Music not only precipitates autonomic and physiological changes but appears to have positive effects on the environment as well. MacClelland (1979) cites the following benefits resulting from creating a musical environment in the operating room.

1. Music creates a warmer, more pleasant environment for the patient and staff.
2. Music provides a diversion, distracting the patient from strange sights and treatments.
3. The patient undergoing regional anesthetic becomes less restless because discomfort from positioning muscle strains is lessened and the time passes more quickly.
4. The use of headsets muffles extraneous noises and may also keep the patient from overhearing inappropriate conversation.

5. Members of the surgical team work in closer harmony because of decreased levels of frustration and fatigue.

6. Appropriate rhythms may stimulate rapid, coordinated movements.

7. The monotony of preparation and cleanup procedures is reduced, contributing to staff morale and efficiency.

Another study evaluated the effects of sedative music on the anxiety of patients in the holding room area of the operating room. Kaempf and Amodei (1989) studied the responses of 33 outpatients scheduled for arthroscopic procedures. They were randomly assigned to a music or control group and the Stait Train Anxiety Inventory, blood pressure, pulse and respiration rates were used to measure anxiety. Data was collected upon arrival in the holding area and following 20 minutes of music listening to sedative music through earphones on cassette. The control group received no music. Results showed a significant decrease in respiration (p<.002), and anxiety scores (p<.005), and systolic blood pressure (p<.05) for the experimental group. Data for the control group showed a significant decrease (p<.02) in systolic blood pressure and anxiety scores (p<.049). Results showed that the respiration rates in the experimental group were significantly lower than those in the control group when the mean differences in scores between the two groups were compared. This study suggests that
a natural decrease in anxiety occurs during a 20-minute waiting period in the holding area.

In a study by Rider (1985) the urinary adrenal corticosteroid (stress hormone) level of 12 nurses was shown to decline during tape listening thereby demonstrating the positive effect of music/guided imagery/progressive muscle relaxation tape on stress. Subjects listened to a tape 5 days a week for 3 weeks. Urine specimens were collected once before the music and twice during four times a day for 4 consecutive days. Oral temperatures were taken concurrently. Results showed corticosteroids and temperature rhythms were significantly (p< .01) more entrained during the tape conditions and circadian amplitude decreased significantly (p< .007). There was no significant decrease in mean corticosteroid levels though they did decline somewhat (p< .15). These results suggest a relationship between music/guided imagery/relaxation techniques and physical health.

Pfaff and Gowan (1989) looked at the effect of music-assisted relaxation in the reduction of children’s distress associated with bone marrow aspirations. Six patients between the ages of 6 and 15 years were observed during three bone marrow aspirations (BMAs) performed without sedation. The first was used as baseline. During the two subsequent BMAs music-assisted relaxation (MAR) was used. The Faces Scale for Fear and the Faces Scale for Pain (Katz, Kellerman, & Siegel, 1982) were chosen to measure children’s anticipatory and experienced fear and pain. This Likert scale consisted of five faces ranging from “Not at all scared” to “very, very scared.” The
Observation Scale of Behavioral Distress (Jay & Elliott, 1986) was used to assess children's distress during the BMA. This measure is a continuous observe/record scale of eight behavioral categories: seeking information, cry, scream, restraint, verbal resistance, emotional support, verbal pain, and flail. Two music therapy interns observed and recorded at 15-second intervals throughout the BMA process, a total of 90 minutes. Interrater agreement of 87.8% was attained by having the two raters observe three BMAs. Though levels of significance were not attained, results found that strong trends that indicated music-assisted relaxation reduced anticipatory fear, anticipatory behavioral distress, experienced fear, and experienced pain. The crying behavior showed the most reduction. The areas of verbal pain, information-seeking, screaming, or verbal resistance showed that MAR had little effect. Pfaff and Gowan concluded that MAR appeared to have the greatest impact on anticipatory behaviors surrounding the BMA and may be advantageous in providing coping strategies to reduce distress of children undergoing painful medical procedures.

In summary, the use of music for cardiac intensive care patients has resulted in significant decreased in anxiety scores, blood pressure and heart rate. Music has also been reported to create a pleasant environment for staff and patients, provide diversion from extraneous noises that may prove stressful, decrease perceived levels of fatigue, and contribute to staff morale and efficiency.
Music Therapy In Patient Participation and Stress Management

The effects of stress on man’s physical and psychological well being have been widely documented. Some experts estimate that as much as 75% of all medical disorders are directly related to stress (Hughes, Pearson & Reinhart, 1984). A multitude of techniques and approaches have been developed to provide coping strategies such as hypnosis, therapeutic touch, toning, polarization, laugh, massage, horticulture, clowning and pet therapy.

Hanser (1985) reported that coping models can be categorized in two ways. (1) The instrumental approach implies direct action of the person to alter the problem. This usually involves altering the environmental demands placed on the person or changing the capacity of the person to respond to the problem. A typical example might involve changing one’s work space or delegating work to others to free oneself for priorities. (2) The palliative approach is the regulating of the emotions associated with stress. It focuses mainly on managing inner tension and avoiding or minimizing distress. Progressive muscle relaxation, guided imagery and music as developed by Bonny (1980), autogenic relaxation training (the integration of repeated suggestive phrases with music and progressive muscle relaxation) and imagery are considered palliative stress-reduction techniques.

Some researchers are investigating the possibilities of musically inducing “thrills,” defined as a slight shudder, chill, or tingling sensation, usually fleeting and localized at the back of the neck. More intense thrills may spread from the point of origin over the entire body.
Goldstein (1980) studied the idea that thrills, like other emotional responses, may be directly related to the physiological release of endorphins. (Endorphins are the body's natural opiates. Joggers describe the sensation they experience when their endorphins are released as getting a second wind or a runner's high.) To test the hypothesis that thrills are physiologically based, Goldstein surveyed three groups: 45 employees of the Addition Foundation (100% responded; all medical students at Stanford (30% or 116) responded; and all music students at Stanford (70% or 126 responded). Each participant listened through earphones in a darkened room to music of his choice that he reported as evoking thrills. Subjects indicated the intensity and duration of the thrill received by raising one finger for lowest intensity, two fingers for strong intensity and three fingers for maximum intensity. The length of time the finger was raised indicated the duration of the thrill and was timed by the investigator to the nearest second. Subjects listened to a second hearing of the same music, only this time they received doubleblind, intravenous injections of 10 mg/ml of saline solution (the placebo) or naloxone, a known opiate receptor antagonist. Data showed that the thrills were significantly attenuated in 3 of 10 subjects injected with naloxone. Those who received saline solution were noted to have little variation in the intensity of their thrills pre/post injection. The hypothesis that naloxone would have no effect in any subject was rejected at $p<.01$. Seemingly this experiment implies that thrills elicited by music may be have some physiological origins. The possibility of facilitating endorphin release with music
could have far reaching health implications, and is a subject for further research. Subjects in the Goldstein study were also asked to indicate how readily a given list of items caused thrills in them. Data revealed that musical passages received the highest rating, with 96% frequency followed by a scene in a movie, play, ballet, or book with a 92% frequency.

Frolich (1984) studied 40 school-aged children to determine whether a music therapy session was more effective than a medical play therapy session in facilitating more verbalizations. Two groups of children were equated according to sex, age, socioeconomic status, length of present hospitalization, session interruptions, type of illness, related number of prior hospitalizations and child life involvement.

All music sessions were identical. Each child participated for 30 minutes in his/her room in activities that included exchange of names, movement, playing instruments, inserting lyrics into songs on hospitalization topics and a good-bye song for closure. Within the lyrics of songs were structured four questions. The responses to these questions served as data.

1. What is the worst thing that has happened to you in the hospital?
2. What is the best thing that has happened to you in the hospital?
3. What scares you the most about being sick?
4. What do you miss the most from home?
These same four questions were asked verbally during the 30-minute medical play session. The format of these sessions consisted of the child being read a story entitled "What Happens When You Go to the Hospital," free play, and the use of medical tools and equipment to "doctor" the therapist.

Opportunities to share personal experiences were prompted through the use of pictures, and verbal closure ended each session. Answers were rigorously coded using a 3-digit system based on presence, type and depth of initial answer. Ninety percent of the music therapy group responses could be coded as answers and 10% as no-answers, compared to 62% and 38% of the play therapy group responses respectively. A significance level of p<.10 was chosen due to the exploratory nature of this research. Results indicated the music therapy group elicited more involved verbalizations about hospitalization than the answers elicited from the play therapy group. This finding was true both for patients with acute illnesses and little hospital experience as well as for those with chronic illnesses with numerous prior hospitalizations. Those children who had prior experience with the child life staff verbalized significantly less than those children who had no previous child life involvement independent of therapy. For those children with similar child life involvement, music therapy elicited significantly more verbalization than play therapy. A significant difference was found regarding the sex of the children. The girls tended to give more involved types of responses than the boys. Frélich concluded that music therapy was more effective
in facilitating the verbalization of hospital experiences and feelings than medical play therapy.

Marley (1984) investigated the effectiveness of music in decreasing stress behaviors of hospitalized infants and toddlers 5 weeks to 36 months of age. Intervention included relaxation, didactic games, movement and songs. She observed a decrease in patients’ crying and throwing of objects and decreased vocalization and lethargy and/or body tension as a result of music in addition to interaction. According to Marley, added benefits included increased attention span, increased verbalization among the older subjects and that music intervention promoted normal growth and development and bonding with staff.

A study by Chetta (1981) with 75 children ages 3 to 8 years investigated whether a music therapy session could transmit adequate information about the surgical experience to the pediatric patient to help reduce fears during induction of preoperative medication. Music therapy intervention included the singing of songs that reviewed the information about the preoperative procedures. A three sample method was incorporated. The control group received only verbal preoperative instruction the night before surgery. Experimental group one received the verbal instruction plus music. Experimental group two received verbal instruction and music plus music immediately prior to induction of preoperative medication on the morning of surgery. Chetta found that experimental group two showed less anxiety before and during induction of preoperative medication as measured by an Observed Behavior Time-Sampling Form (10 seconds observe and 5 seconds
Behaviors were categorized and assigned scores according to noise (crying, screaming) and motor (physical resistance). Data also included a parent questionnaire. The groups receiving music therapy were rated by parents as being less anxious than the other two groups. Chetta comments on the issue of timing in preparing children for surgical procedures. She questions whether the child relates information received the night before surgery to the actual procedure the following day and suggests that instruction received just prior to surgery may be more transferable. Another observation was that, even though a child may understand the medical procedures and how to respond to make it less painful, he or she may not necessarily apply this understanding when needed. Chetta adds that the presence of the music therapist as well as the music had an impact on the measure of comfort and coping experienced by the children, but the degree to which this occurred was not known.

Guzzeta (1989) tried to determine whether relaxation and music therapy were effective in reducing stress in a coronary unit. Eighty coronary patients were assigned to one of three groups: music therapy, relaxation, or control. There were three 20-minute sessions over 2 days. Stress was evaluated by heart rates, peripheral temperatures, cardiac complications and qualitative patient evaluative data. Data revealed that lowering heart rates and raising peripheral temperatures were more successful in the relaxation and music therapy groups than in the control group. The researcher surmised that relaxation and music therapy are effective in reducing stress in coronary patients.
Thaut (1989) found in 50 psychiatric prisoner-patients over a three month period that music therapy had the strongest impact on self-perceived relaxation states (p<.05), followed by improved mood/feeling states and positive thoughts about self and one's own life. Treatment groups included a music group therapy, instrumental group improvisation, and a music and relaxation group. Clients used three self-rating scales before and after each music session. These scales focused on three areas: (1) mood and emotions, (2) relaxation, and (3) thoughts about the client's life. Scales were derived from a survey of 130 prisoner-patients concerning the perceived therapeutic benefit of participating in music therapy. Results showed that in all three treatment modalities, patients reported significant (p<.05) improvement after music therapy, thereby demonstrating music to be an effective intervention in producing self-perceived changes in relaxation, feeling, and thinking states in a short-term measurement situation. Thaut admits that negative aspects of this study were the limited sample size, lack of reliability and validity of the scales, and the susceptibility to bias in the self-report scales.

Gross and Swartz (1982) examined the effects of 8 music therapy sessions on the state and trait anxiety of chronically ill patients in a rehabilitation center. The State Trait Anxiety Inventory (STAI), a short pencil-paper test, was the measure chosen because of its relatively high validity and reliability. It was administered orally because of the physical handicaps of the participants. Eleven patients were in the experimental group and 8 in the control group. A baseline of STAI
scores were taken. The control group received psychotherapy but no music therapy. The experimental group then received 8 weeks of music therapy in addition to their regular psychotherapy. Music therapy sessions were aimed at stimulating interaction, singing, solos, releasing pent-up feelings and improvisations. After 8 weeks the STAI was administered again. Results showed that all trait anxiety scores in the experimental group decreased and increased in the control group. All state anxiety scores of participants were reduced. The scores were statistically significant from the control group, p<.05. Gross and Swartz concluded that their findings support the hypothesis that music therapy can have a significant effect on state/trait anxiety in chronically ill patients.

In summary, research on music therapy and stress management and its emotional impact on patients indicates that music can affect changes in autonomic functions, facilitate endorphine release and other hormonal changes, and provide coping strategies that improve mood, encourage communication, and feelings of self-worth.

Use of Music with Dying Patients

The issues of dying patients and palliative care have become the object of much attention since Elizabeth Kubler-Ross published her work on the stages of grief and death. According to findings of Dubrey and Terrill (1975), who through a questionnaire examined the feelings of 50 terminally ill patients, there are several common concerns, each having the potential to be addressed through the theoretical foundations
and practices of music therapy. Those findings are listed below with the author’s comments as to how music therapy may be applicable.

1. Dying patients often express loneliness, resulting either from withdrawal from relationships prior to death, or from social isolation (i.e., avoidance of a patient because he or she is dying)

One role a music therapist may assume is to provide companionship with the dying patient that focuses on adding quality to the patient’s life. The degree of patient involvement and interaction may vary according to the willingness and extent to which patient and therapist are able. Regular visits may give the patient something to look forward to and add a sense of routine in his daily schedule. This relationship with a music therapist may be especially appreciated at a time when family may slowly withdraw because of the pain or difficulty involved in watching a loved one die. If the patient’s death is prolonged, members have responsibilities or circumstances that restrict the frequency of their visits.

2. Maintenance of hope for the dying patient constitutes an important source of physical and emotional support.

Because a patient chooses only to receive palliative care, that is, treatment limited to keeping the patient comfortable, this does not preclude his need for continued emotional support. In addition to the numerous medical and physical tasks that are routinely performed each day for a dying person, e.g., turning and positioning, attending to personal hygiene, monitoring of vital signs, and administering medication, attention to the psychosocial needs is important. Music
therapy can be a particularly humanizing intervention during a time when other kinds of involvement are limited.

3. The dying patient demonstrates apprehension due to increasing dependence on others for the fulfillment of physical needs.

It is not uncommon for patients to speaking openly with a member of the hospital staff about their feelings of despondency regarding their physical and mental decline and their subsequent reliance on family. The writer has often experienced that terminal patients are deeply concerned about the financial hardship they bring about on their families because of exhorbitant medical costs. Rather than imposing the additional burden on the family of expressing these feelings of guilt and inadequacy, the patient will sometimes choose to voice them to a nonfamily member. The music therapist's role and the nature of the work may often be regarded by the patient as nonthreatening, and subsequently may allow the ideal circumstances for developing a relationship in which a patient can freely share his thoughts. To do so could possibly help to lessen the weight of apprehension and anxiety that dying patient's sometimes experience.

Music therapist Marion Palmer suggests that music therapy has tremendous possibilities in providing emotional support to the frail and aging on several levels (1977). Palmer recommends that music therapy sessions properly structured can assist in achieving and maintaining the highest possible level of functioning to maintain patients' rightful dignity. She points out special problems, similar to those faced by the dying patient that are inherent in the aging process that result in
diminished self esteem and damaged ego and which can result in frequent hostility, negativism and even abuse.

4. Religious faith often assumes a new, more important perspective during the death process.

The patient's personal religious belief system and church alliances can form strong bonds of support. The music associated with this can serve to reinforce his sense of strength and control. Hymns, anthems, gospel songs and spirituals can play a unique role in a patient's life at this stage and their impact should not be overlooked. Lyrics that reflect comfort, reassurance, hope and in the case of Judeo-Christian tradition, anticipation of life after death, can provide encouragement and direct the patient's attention positively.

Pilsecker (1975) states that dying patients welcome the opportunity to talk about death and that they have a need to either review in totality or a portion of their past.

Singing or listening to songs with lyrics that focus on the issues of dying, grieving or loss can be therapeutic in assisting the patient and/or family in facing death. Music therapy sessions including the family and patient can assist in prompting conversation about specific topics, reflection, and opening genuine lines of communication. Music that has special meaning for family and patient can be comforting, energizing, provide comic relief, or set the stage for spontaneous interaction. These occasions of family singing, listening or making music together can be recorded or simply cherished as memories of the times spent with the patient. Such occasions can serve to reassure the family of their positive
and creative involvement in the dying process. In many cases music therapy has the potential to be as beneficial to the family as to the patient in working on grief issues. The singing of “sad” songs (lyrics dealing with loss, death and dying) may be perceived as lessening the quality of life or creating a morbid, tearful atmosphere. For some patients this may be true and the music therapist must be sensitive to the patient’s temperament. But it is important to realize that tearful behavior can be therapeutic, cleansing and provide a constructive and realistic way of dealing with impending death.

Curtis (1986) investigated the effects of music listening on 9 terminally ill patients’ perceived degree of pain relief, physical comfort, relaxation, and contentment. Patients self-recorded responses to three conditions: music, no music, and taped hospital background sounds. Each condition was presented for 15 minutes twice daily for 2 days. Graphic analysis of individual responses seemed to indicate that terminally ill patients experienced some positive results from using music. Although results also showed no significant difference in the patients’ perceived degree of pain relief, physical comfort, relaxation and contentment during any of the conditions, contentment score differences approached significance (p<.069). Some individual patient responses implied that background sounds had a negative effect, and Curtis suggests that music might be beneficial for masking hospital noises. Curtis admits that by necessity this study was restricted in scope, but concludes that an analysis of individual patient responses to the study strongly imply that music is an effective tool with the terminally ill.
Some researchers have focused on descriptive studies that look at the role of music and its therapeutic effects on pediatric cancer patients. Fagen (1982), a music therapist working with terminal pediatric patients at Memorial Sloan Kettering Cancer Center, contends that creating and listening to music can provide energy, relaxation, and escape into fantasy for children and that the nonmedical relationship with a music therapist can provide a therapeutic vent for voicing frustration and fear. She advocates an eclectic approach utilizing song writing and selection, lyric substitution, improvisation, guided imagery and including family in regularly scheduled music therapy sessions. Fagen demonstrates through anecdotal evidence that by using music to focus on those things a child can do can dramatically effect the quality of life of a dying child.

Similarly, Bailey (1984) advocates the use of songs with cancer patients and their families as a means of providing support, diminishing loneliness, processing grief and resolving issues of loss, change, tension and depression. She stresses that there is an inherent association between song lyrics and human experience and that singing, listening, cognitive stimulation and the building of relationships can provide a framework for pleasure, integration and tension release. Bailey found that people tend to choose the songs that support their needs and convey the mood and message they want to hear.

In summary, research on music therapy with dying patients indicates that it can be used as a catalyst to evoke communication and reflection, help reduce feelings of isolation and depression, and provide a source of spiritual and emotional support. It seems clear that music
can appreciably affect the quality of one's life even with dying patients with extenuating physical and/or mental limitations. The literature also suggests that there is merit in the use of music to change or modify our external environment in the hospital setting.

Chapter 3 will present data collection methods and analysis, describe the subjects, setting, and treatment.
CHAPTER III

PROCEDURES FOR DATA COLLECTION AND ANALYSIS

This chapter begins with a description of the setting where the research was conducted and a brief overview of how the music therapy program there was developed and implemented. Secondly an account of the subjects who participated in the study is presented, followed by details of the music therapy treatment, data collection and analysis, and examples of patient responses.

The Research Setting

University Hospitals of Cleveland (UHC) is a private, non-profit 919-bed medical complex and primary teaching facility for the Case Western Reserve University School of Medicine. It is comprised of seven specialized hospitals. Both the Hospital and the School of Medicine are committed to a multidisciplinary approach in the delivery of health care and have developed a number of interdisciplinary centers, including the Ireland Cancer Center. An important characteristic of the hospital’s approach to health care is the interdisciplinary team. These teams bring together physicians, nurses, social workers, creative arts specialists and other health care professionals to assure that all aspects of the patient’s physical and emotional needs are addressed.

The Ireland Cancer Center, established in 1985 by the hospital board of trustees, is a comprehensive, multidisciplinary program that
coordinates all cancer related activities at UHC including research, patient care, education, prevention and control. Over 100 physicians, nurses, social workers and allied professionals participate in the Cancer Center’s programs. In 1989 there were 3,365 cancer related admissions and 18,000 outpatient visits, excluding radiation therapy. The cancer program is certified by the American College of Surgeons. It serves as a Bone Marrow Transplant Referral Center for the Eastern Cooperative Oncology Group, a group of over 20 medical school affiliated hospitals in the United States. In 1987, the Case Western Reserve University/Ireland Cancer Center received official designation as a National Cancer Institute Research Center, the only such center in Northeast Ohio. The writer initiated the first music therapy program at the Ireland Cancer Center.

This study was conducted at Rainbow Babies and Childrens Hospital (RB&C), a part of the University Hospitals of Cleveland and the Ireland Cancer Center. RB&C is a nationally acclaimed, private, nonprofit hospital with 226 beds that provides care to newborns and patients up to 21 years of age. Family-centered care is the hospital’s central focus. RB&C’s range of services include intensive, acute and primary care. It is a teaching, research-based hospital affiliated with Case Western Reserve University. Over 7,700 inpatient admissions in 1989 resulted in over 61,300 patient days. This study was reviewed and approved by the Institutional Review Board of RB&C. This process required that the researcher submit a detailed proposal describing the study’s intent, evaluation procedures, subjects, known risks and/or
benefits of the study, a consent form and time frame in which the study was to be completed. The proposal was formally reviewed by a board of physicians. Later signed consent was obtained from the parents of each subject.

**Overview of Music Therapy Program**

The Ireland Cancer Center, and Rainbow Babies and Childrens Hospital were introduced to music therapy through an inservice from the writer. A grant from the local unit of the American Cancer Society was awarded to the writer to determine the feasibility of using music therapy with oncology patients. As a result of the feasibility study, the writer was offered a full-time position as director of music therapy of the Ireland Cancer Center.

Each month approximately 230 patients and family members ranging in age from 4 months to 86 years receive music therapy services. Adults are seen individually as are children who are confined to their rooms in protective isolation. Children from 2 to 18 years of age are also seen in groups of 4 to 25, depending on the number of hospital admissions. During music sessions, parents, siblings and other visitors are encouraged to participate as well as hospital staff. Progress notes are left in each patient’s medical chart to reflect music therapy objectives, recommendations and patient response. There is no charge to patients for these services, nor are these services eligible for third party reimbursement. The budget for working capital is maintained by
intermittent donations and honoraria received by the writer for presentations to local community groups and at conferences.

One of the primary roles of the music therapist is to provide a nonthreatening, accepting environment wherein patients can participate or benefit to the degree their ability and willingness dictate. The music therapy program at RB&C consists of several basic components. Music is used as a pain distractor during painful procedures, while waiting for pain medication and in the recovery room following surgery. The music therapist sings to and with patients and families as well as teaches them to play instruments to decrease boredom and feelings of isolation. Pre-recorded cassette tapes or personalized tapes are provided to promote relaxation and/or enhance the visualization process. The writer regularly schedules musicians to perform for patients collectively and individually in their rooms.

In the opinion of the author one of the most unique and mutually benefical aspects of the music therapy program is composing songs with patients to express their feelings and to provide emotional support. These songs are often recorded or “performed” for staff and family by the patient and reflect humor, frustration, coping strategies and thoughts about family and staff. The writer also composes personalized discharge songs to be sung by staff to patients on the day patients go home. In summary, the overall purpose of the music therapy program is to use music to motivate and inspire patients, to provide emotional and psychosocial support, to increase communication between patients, staff and family members and to increase the patient's self-esteem.
Subjects

Subjects were 40 in-patients at Rainbow Babies and Childrens Hospital (RB&C), a part of the University Hospitals of Cleveland. Eighteen boys and 22 girls participated. The children were 6 to 12 years old with a variety of diagnoses, including seizure disorders, Kawasaki Disease, lead injection, brain tumors, lymphoma, leukemia, fecal impaction, splenic hematoma, sickle cell anemia crisis, fractured limbs, asthma, cystic fibrosis, respiratory infection, ruptured appendix and multiple internal injuries. To participate, subjects had to be inpatients and taking no immunosuppressant drugs. Each child was given a verbal explanation of what would be expected of him and asked if he was willing to participate.

Written and/or verbal parental consent was obtained by the researcher from the parents of the subjects. This form was a formal one page description of the study as required by the hospital investigation review board. It described the purpose of the study, the pre-tests and post-tests and the amount of time expected of each participant. The researcher’s name and extension was given for further questions regarding risks, hazards and benefits of the study. A section for the subject’s name, age and parent’s signature was included. (See Appendix B.) Ninety-five percent of the parents who were asked permission for their child to participate willingly agreed. Other parents who heard about the study asked if their child could be included. The writer obtained consent by speaking with parents by phone or if in
person if they were present. This was done as far in advance as the day before testing or as little in advance as within one hour of testing.

Some parents appeared overwhelmed and anxious with the experience of their child’s hospitalization and were reticent about signing “yet another consent form.” They reported not wanting to impose any more intervention than was absolutely necessary for their child. After several rejections from parents of potential subjects the researcher began introducing the research to parents with the statement, “I am interested in learning if music will help your child feel better.” This statement was followed by a description of the study without referring to it as such. This strategy seemed to be more palatable to parents and consent forms were signed with little hesitation with this approach.

Subjects were randomly assigned to an experimental group (Group A), which received 30 minutes of music therapy, or control group (Group B), which received no music therapy intervention. To avoid unbalanced assignments of subjects a block design of size four was used for the randomization. Patients were grouped according to their chronological entry into ten blocks of four patients each. Treatments were assigned within each block to facilitate a balanced allocation of treatment and nontreatment. The mean age for Group A was 8.4 years and for Group B, 8.5 years. The overall mean age was 8.45 years.
Data Collection Procedures

This section describes the procedures used to obtain data. Three types of data were collected in this study to determine the effects of a 30-minute music therapy session on a hospitalized child. All tests were administered in a pre/post test design:

1. A physiological measure: Salivary Immunoglobulin A test
2. A psychological measure: Measurement of speech pause time with a voxaflex machine
3. A psychological measure: Patient Opinion Likert Scale

The tests were given in the order reported above for the pre-test and were administered in reverse order for the post-test. In other words, the pre-test order was Likert Scale, Voxaflex, IgA and the post-test order was IgA, Voxaflex, Likert Scale. The reason for the reversal was that since the music therapist collected the IgA samples, it seemed timely to secure the samples before leaving the subject's room. Otherwise the therapist would have had to leave the subject, arrange for the other two tests to be administered, then return. An IgA sample taken immediately after the last activity would most likely reflect the patient's response to the overall session. Waiting until a person was found to administer the other tests, may have resulted in time delays and the IgA samples may have reflected whatever variables that occurred between the session's end and the time the sample was collected. Taking the sample directly at the end of the session helped the music therapist to control for this variable. Procedures for administering the measures follow.
Salivary Immunoglobulin A Test (IgA)

Subjects were asked by the writer to place 2cc's of their saliva in a small plastic vial on which the 2cc line was clearly marked. Salivary IgA is thought to be associated with mood and immunological changes. One of its functions is to mix with and coat food as it is being chewed in order to protect the digestive system from any bacteria in the food. Studies have showed that lower concentrations of salivary IgA were significantly associated with reports of more frequent illnesses (McClelland, Floor, Davidson, & Saron, 1980).

The Kallestad Low Level Immunoglobulin Test Kit was used to evaluate the IgA samples. This kit contains several plates with pre-treated wells for the salivary samples. Three vials containing reference sera are included and serve as a reference point from which the research samples are evaluated. Pre/post saliva samples were initially spun in a centrifuge at 2000 cycles per minutes for 15 minutes to separate the saliva from the sediment before testing. Using a volumetric pipette, 5 milliliters were added to wells in an agarose gel. (Samples diffuse radially through the gel and the antigen, the substance being assayed, form a precipitin ring). Ring diameters were measured through a microscope to the nearest 0.1 mm. and scores reported in milligrams per deciliter. All samples were read and recorded after a 48 hour incubation period.
Speech Pause Time

Speech pause time (SPT), was monitored with an instrument called a voxaflex, which can be attached to a telephone receiver. After placing the child’s phone within his reach, the writer called the child from another phone outside the room. The writer attached the ear piece from the voxaflex to the telephone receiver and for 3 to 4 minutes used a prepared list of questions to engage the child in conversation. (See Appendix B). The content of these questions focused on subjects with which the child would be most familiar, such as his favorite foods and television programs, what he would buy at the local toy store, what he enjoyed playing most, his least favorite thing to do, what made him happy or sad and where he would go on a vacation. The voxaflex monitored the conversation from the time the child began speaking until he hung up the phone. This list of questions was developed by the writer as a means of motivating the child to talk continuously for 3 to 4 minutes. The writer thought that the more familiar the questions, the more likely the conversation would reflect the child's normal flow of speech. The writer wanted to avoid the child having to stop and think or to hesitate. This could have caused abnormally long pauses and interfere with a true voxaflex score.

Because music has been reported to influence changes in mood and psychological well-being, this test was used to determine if any changes in those areas could be detected by a change in SPT after 30-minutes in participatory music session. The three-digit score displayed on the voxaflex was recorded for subsequent analysis.
Likert Scale

Subjects were asked to tell how they felt by pointing to one of five numbered faces drawn on a page. This was an 8 1/2 x 12 sheet of white, typing paper with circular faces approximately 2 3/4 inches in diameter. (See Appendix A). Faces were graduated from very sad to very happy, with number one being very sad and number five very happy. To avoid the possibility of patients wanting to please the researcher, subjects were asked by someone other than the music therapist to “point to the face that looks like you feel.” The person who administered this test was usually a child life specialist, volunteer or nurse. Care was taken that the child would not associate his post test answer with the music therapist in order to avoid the child’s feeling pressured or influenced to say something favorable about the music session or the therapist.

The child was not told that his answer was to be directly related to how he felt about the music therapy session. Rather, the intent of the researcher was that the child’s answer reflect any changes in his perceived affect before and after music. The corresponding number under the face chosen by the child was reported to the researcher for subsequent analysis.

Administration of Measures

Data from the 40 subjects was gathered over a 5-month period, November 1989 through March 1990. All music intervention with the experimental group was conducted by the writer with each patient in
his/her room. Treatment consisted of a series of music therapy activities that involved a hello song, singing, identifying, passing and playing instruments, imitation and listening games and a closure song. The music therapy activities were progressive in nature, that is, requiring more interaction and participation from the patient with each activity. For example, the "Hello Song" required the child only to listen, and playing the omnichord (a touch sensitive instrument with a harplike sound) was optional. The second activity asked the child to identify familiar tunes either with a nod in answer to the therapist's question (i.e., Is it Twinkle, Twinkle Little Star?) or to name the title. The third activity required identifying, passing, and playing instruments. The final activity asked the child to play the omnichord, sing and create words to a goodbye song if they desired. This format was used in order to gradually build trust and rapport between the therapist and child. Music procedures are explained in greater detail later in this chapter.

Subjects in the control group were allowed to continue for 30 minutes in whatever activity they were engaged at the time. The music therapist, however, tried to prevent any aversive intrusions to the patient such as injections, examinations by physicians or painful testing procedures. Some of the activities of Group B included writing, reading, playing with building blocks, talking with a roommate, drawing, watching television and playing a Nintendo video game. Group B did not participate in any music-related activities during this 30-minute testing time.
The control subjects were given the pre/post tests in the same order and manner as the experimental group, often with the help of another music therapist. Neither RMT remained with the control subjects during the 30-minute period. However, music was offered to the child after the post tests, and nearly all subjects accepted the offer with enthusiasm. Time conflicts with lunch, tests or episodes of pain were reasons given for declining music. The possibility of receiving music after the 30 minute period was not mentioned to any of the subjects until after the post tests were completed.

IgA samples were frozen and stored for batch analysis. Scores for SPT and the Likert scale were recorded and later tabulated.

Data Analysis Procedures

The following section describes the procedures used to analyze the three measures used in this study.

IgA Test

The Wilcoxon Signed-rank test was used to analyze differences because the data were not normally distributed. Therefore the use of this nonparametric test was appropriate. The Wilcoxon Signed-rank test was used to determine the differences between the following.

1. Pretreatment and posttreatment scores of the experimental group
2. Pretreatment and posttreatment scores of the control group
Patient Opinion Likert Scale

Pretreatment and posttreatment data consisted of a single digit number between 1 and 5. The Wilcoxon Signed-rank test was used to determine differences between:

1. Pretreatment and posttreatment scores of the experimental group
2. Pretreatment and /posttreatment scores of the control group

Speech Pause Time Measurement

Data from the voxaflex consisted of one three-digit numeral for each subject. The Wilcoxon Signed-rank test was used to determine differences between:

1. Pretreatment and posttreatment scores of the experimental group
2. Pre/post treatment scores of the control group

The Wilcoxon rank sum test was used to determine differences between the pretreatment and posttreatment means of the experimental and control group for each of the three measures used.

Description of Treatment

Forty pediatric patients were randomly placed into an experimental group (Group A) and a control group (Group B). Subjects in the experimental group received a 30-minute music therapy session after the three aforementioned tests were administered. These tests were repeated after a single 30-minute session. The control group received no music therapy but were asked to continue in whatever
activity they normally participated during that time of day. Attempts were made to forestall any painful or invasive procedures for all subjects during these 30 minutes.

The music therapy session was the same for each child, with the exception of song substitutions depending on the child’s age. Each child was tested separately.

The goals of the session were to encourage patient’s verbal and motor participation in music activities, to involve patients in singing and playing instruments as a means of creative self-expression, and to encourage patient interaction in choosing, identifying, sharing and playing a variety of musical instruments. The music therapy session consisted of five activities. They are described below in detail.

Activity #1: Hello Song With Omnichord Accompaniment

Patient and therapist began the session by playing a Suzuki omnichord (a touch-sensitive instrument with a harp-like sound). After a brief improvised demonstration by the RMT, the patient was asked to play the instrument with the therapist, then on his own, and finally in duet fashion with the therapist pressing appropriate chord buttons as the patient strummed. The RMT demonstrated changes in the omnichord’s register (high or low), tempo (fast or slow) and dynamics (loud or soft). Verbal and tactile reinforcement was given to the patient for all appropriate attempts to imitate or respond to therapist. The introductory hello song was personalized with the subject’s name. The
subject was then asked to repeat the song using the therapist’s name. This activity was approximately 5 minutes long.

(To the tune of Good Night Ladies)
Hello __________. Hello __________.
Hello __________. It’s good to have you here.

The song was elongated with the following:
(To the tune of Someone’s in the Kitchen With Dinah)
Someone’s making music with __________.
Someone’s making music I know
Someone’s making music with __________.
Strumming on the omnichord
And singing fe, fi, fiddly-i-o. fe, fi, fiddly-i-o, fe, fi, fiddly-i-o
Strumming on the omnichord.

Activity #2: Song Recognition

The therapist played the omnichord and sang familiar songs on the syllable “la” and asked the subject to name the tune. Patient and therapist then reversed roles and the therapist took a turn at guessing. These tunes included familiar commercial jingles, television theme songs, patriotic, religious, folk songs and nursery rhymes. The RMT chose songs that would be most recognizable according to the age and experience of the child. Therefore this part of the treatment varied somewhat from child to child. The RMT’s intent was to assure the child success and fun in answering. This was a 5 minute activity.
Activity #3: Creative Composition

The therapist removed several rhythm instruments from a box one at a time, named them and allowed the subject to name and play each of them. The names of animals in the song Old MacDonald were replaced with the names of instruments, i.e., Old MacDonald had a band, E-I-E-I-O. And in his band he had a tambourine, E-I-E-I-O. With a _________ (subject played the instrument at this point) here and a _________ there, etc. Instruments used were an asuucci cabasa, vibraslap, flexitone, guiro, tambourine, maraca and bells. During the second part of this ten minute activity the subject closed his eyes and was asked to identify each instrument auditorily. The therapist often played two, three or more instruments simultaneously to challenge the subjects. Subjects then took a turn playing as the therapist tried to identify the instruments being played.

Activity #4: Imitation and Improvisation

During this 5-minute activity, a pair of rhythm sticks was given to the subject. The therapist played several simple rhythmic patterns for the subject to imitate with a separate pair of sticks. Care was taken to assure the subject of a successful response. The patterns increased or decreased in complexity according to the subject’s ability to replicate them. The therapist and subject reversed roles and the subject assumed the position of leader. The therapist usually allowed the subject to “win” at some point by not being able to repeat the subject’s rhythmic pattern appropriately. The second part of this activity included
paraphrasing “She’ll be Coming Around the Mountain” with words about the subject, i.e., “She’ll be drinking cherry kool-aide with her straw.” Subjects were asked to substitute the names of their favorite foods, beverages and desserts. Rhythm sticks were used to keep time to the music as therapist and subject sang.

Activity #5: Goodbye Song

A good-bye song provided closure to the session. “Good Night, Ladies” was changed to “Goodbye, _______” (child’s name) etc. The therapist sang instructions to dialogue with patient (i.e., Shall we do this again? Put the bells in the box. Sing good-bye to me. You were the greatest musician I have seen today, etc.). The patient accompanied the therapist on the omnichord and responded in kind by answering questions in a singing fashion and concluded by singing the goodbye to the therapist. If patient chose not to sing or verbally interact during the song, therapist assumed total responsibility for the song.

Patient Responses

The researcher found that there were a number of inherent problems and disruptions in conducting research in a hospital setting. Because of the variety of procedures and number of hospital personnel that interact with any given patient it was difficult to control for many variables that may ultimately have affected patient response. In this section the writer has described some of the difficulties and how they appeared to affect the subjects. The researcher’s purpose in presenting this material is to alert future researchers to the frustrations in
conducting studies of this nature and to indicate clearly how patients' responses in this study may have been affected.

The participants in this music therapy study were subject to routine hospital interruptions. A sign was placed on the door of each subject's room that read, "Music therapy session in progress. Please wait. Maximum waiting time 30 minutes." This was intended to prevent disruptions. However, because the control group appeared not to be engaged in activity with the music therapist, the sign was periodically ignored. Similarly the subjects in the experimental group were interrupted by unannounced visits from housekeeping personnel; food tray, balloon and flower deliveries; dietary checks; and unexpected visits or calls from friends. The overhead intercom was in continuous use, and nurses often went in and out of the room to care for the subject's roommate(s). Several emergencies occurred on the floors during the sessions which resulted in a flurry of activity in the hallways. It was not uncommon to hear children crying or screaming, or to see them walking, running or playing with staff in the halls. Other pediatric patient's on the unit were often drawn to the music and entered the room during a music session and asked if they could participate or "go next." The music therapist tried to focus the participants' attention on the music activities as much as possible to lessen the impact of these distractions.

Other problems in the hospital setting may have affected the data collection for this study. For example, the roommates of some subjects voiced concern about being excluded. Some parents insisted on
remaining in the room during the study. Some patients voiced concern about not being available to see family should they come while music was occurring. Several times the subjects were informed that they had been scheduled to have the coveted Nintendo video game at the designated time for the music session.

IgA Problems

Dry mouth sometimes contributed to the difficulty some subjects had in producing a timely salivary sample. For some children 2 cc’s (about 1 teaspoon) took less than one minute. For others it took as many as 8 minutes and appeared to be a tedious process both then and when they had to repeat it 30 minutes later. Some children referred to the test as “yukky,” “embarrassing” or “gross,” while others insisted they could “fill the whole tube up” if needed and appeared to have no qualms about it.

Voxaflex Problems

Data collection was delayed as much as 10 to 15 minutes in several instances because of one or both telephones needed were unavailable. Numerous times the voxaflex malfunctioned or registered questionable data or no data at all. The green light on the voxaflex signals that it is registering the voices at an adequate volume. It was noted that intermittently the light was inoperable perhaps due to the quietness of the child’s voice or due to some technical malfunction. Similarly, it registered the intercom messages and loud background
noise when the child was not speaking. Therefore, the validity of the SPT scores is in question.

Patient Opinion Likert Scale Problems

Often there was difficulty in getting someone to administer the Patient Opinion Likert Scale at the appropriate time. Nurses and child life specialists were often unavailable and housekeeping or volunteers were asked to administer the test in order to keep the subjects from feeling pressured to please the researcher with their response. It became apparent by some of the children’s comments that their choice of smiley faces had some direct relation with the person who presented the test. For example, one child admitted during the session that she was frightened of the lady that came in with the smiley-face paper because she had hurt her the night before with a shot. Similarly, other extraneous circumstances influenced the children’s response. A child’s lunch tray arrived as the therapist left. He had just vociferously thanked the RMT for the “best time he ever had” yet chose the saddest face when presented with the Likert scale. The child said, “I asked for a hot dog for lunch and they sent me a hamburger. That’s why I’m sad.” To many children the fact that the music time was over appeared to have triggered disappointment, reminded them of their parent who had left the room, or initiated verbal concern about being left alone. Often this would precipitate crying, verbal discontent, or bargaining with the music therapist to remain, and subsequently would be reflected in their Likert choice.
It is apparent, then, that although these three measures were chosen as a nonintrusive and nonanxiety-producing means of securing information about the effects of music, there were circumstances that could have measurably affected the final results. Chapter 4 will describe the statistical results of each of the measures.
CHAPTER IV

DATA ANALYSIS

This chapter describes the statistical results of the three pre-post measures used to evaluate the effects of music on hospitalized children: the Salivary Immunoglobulin A Test, the Speech Pause Time Test, and the Patient Opinion Likert Scale. According to the Normalcy Test, the data for each of the measures did not appear to be normally distributed, therefore nonparametric tests were used. Four hypotheses were formulated for each of the three variables. The Wilcoxon Signed-rank Test for dependent samples was used to analyze differences between pre-test and posttest in the experimental group and the control group. Tables 2, 4 and 6 present this data and the resulting p values. To test for differences in the change between the experimental and control group, the Wilcoxon ranked-sum test for independent samples was used. These results are reported in summary tables 3, 5 and 7. The chosen significance level for this study was $p \leq 0.01$.

Table 2 shows the pretest and posttest IgA scores of the experimental and control groups. The p value was obtained from testing separately the pretest and posttest of the treatment group and the pretest and posttest of the control group using the Wilcoxon Signed-rank test. The null hypotheses for these two tests are that the pre-test and post-test IgA scores are equal. Whereas, the alternate hypothesis is that the pre-test and post-test IgA scores are different.
TABLE 2

WILCOXON RANK SIGN TEST FOR PRE AND POST DATA AND
*p*-VALUES FOR EXPERIMENTAL AND CONTROL GROUPS: IgA

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Control Group</th>
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<tr>
<td>Subjects</td>
<td>Pre</td>
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\[ p \geq .01^* \] \hspace{1cm} \[ p \geq .29 \text{ n.s.} \]

Although both the experimental and the control groups experienced an increase in IgA, improvement in IgA was significant only between the pretest and posttest of the experimental group \((p \geq .01)\). Subjects who received music therapy had a significantly higher
increase in their IgA. Given this result, the nonparametric statistic implies that the treatment was a significant factor in increasing IgA in hospitalized children. Therefore, the null hypothesis, which states that the pretest and posttest IgA scores of those who participate in a 30-minute therapy session are equal, was rejected in favor of the alternative hypothesis.

The Wilcoxon ranked sum test was used to determine statistical differences in the change between the experimental and control groups. The null hypothesis for this test was that there is no significant difference in the change between the experimental and control group IgA scores, compared to the alternate hypothesis which states that there is a difference. Table 3 presents these data.

TABLE 3

WILCOXON RANK SUM TEST FOR MEAN SCORE AND p-VALUE FOR CHANGE IN EXPERIMENTAL AND CONTROL GROUPS: IgA

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Score</th>
<th>STD Dev.</th>
<th>p-value</th>
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<td>20.45</td>
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<td>Control</td>
<td>17</td>
<td>16.32</td>
<td>31.37</td>
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Table 3 shows that there was no statistical difference in the change from pretest to posttest for the experimental and control group. Though there is no significance in the change of the IgA scores of the experimental and control subjects, there is a trend in favor of the treatment, which may indicate that the treatment is effective.

**TABLE 4**

**WILCOXON SIGNED-RANK TEST FOR PRE AND POST SCORES AND p-VALUE FOR EXPERIMENTAL AND CONTROL GROUPS: PATIENT OPINION LIKERT SCALE**

<table>
<thead>
<tr>
<th>Subjects</th>
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<tr>
<td>14</td>
<td>5</td>
<td>5</td>
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<tr>
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<td>16</td>
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<td>17</td>
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</tr>
<tr>
<td>18</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

\[ p \geq .10 \] \hspace{2cm} \[ p \geq .19 \]
The Wilcoxon Signed-rank test was used to determine whether there were differences between the pretest and posttest of the experimental group and the pretest and posttest of the control group. Table 4 shows the pretest and posttest scores and $p$-values for the Patient Opinion Likert Scale of the treatment and control groups.

Data indicate that there is no significant difference between the pre and posttest Likert scores of the treatment group or between the pre and posttest Likert scores of the control group. The $p$ value for the treatment group is marginal at .10, indicating a possible small effect due to treatment. However, there appears to be no statistically significant difference between the pre and post test scores for the control group.

The Wilcoxon rank sum test was used to determine statistical differences in the change between the experimental and control groups. The null hypothesis is that there is no significant difference in the change between the experimental and control group Likert scores, whereas the alternate hypothesis which states that there is a difference. Data for this test are presented in Table 5.
TABLE 5

WILCOXON RANK SUM TEST FOR MEAN RANK, STD AND p-VALUE FOR CHANGE IN EXPERIMENTAL AND CONTROL GROUP: PATIENT OPINION LIKERT SCALE

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Range</th>
<th>STD Dev.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>19</td>
<td>18.84</td>
<td>28.42</td>
<td>p ≥.92</td>
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<tr>
<td>Control</td>
<td>18</td>
<td>19.17</td>
<td>28.42</td>
<td></td>
</tr>
</tbody>
</table>

This table shows that there was no statistically significant change between the Patient Opinion Likert scores of the experimental and control groups. Therefore, the null hypothesis was not rejected.

Table 6 presents the pretest and posttest Speech Pause Time scores of the experimental and control groups, and the p value obtained from utilizing the Wilcoxon Signed-rank test. The null hypothesis for this test for the purpose of this study is that there is no difference in the pretest and posttest Speech Pause Time scores of those subjects who participate in 30-minutes of music therapy and the pretest and posttest scores of those who do not receive music, verses the alternate hypothesis which states that there is a difference.

Data in Table 6 indicate that there is no significant difference between the pretests and posttest Speech Pause Time scores of either the
experimental group or the control group. This suggests that the treatment was not significant in the hospitalized child’s perception of how he felt. Therefore, the null hypothesis was not rejected.

Data in Table 7 present the change in the difference between the pretest and posttests of the Speech Pause Time scores for the experimental and control groups. The Wilcoxon Rank Sum test statistic indicates there was no statistical difference in the change between those who received music and those who did not, and therefore, the null hypothesis that there is no significant difference in the change between the Speech Pause Time scores of the experimental and control groups was not rejected.
TABLE 6

WILCOXON RANKED-SIGN TEST FOR PRE AND POST SCORES
AND p-VALUE FOR EXPERIMENTAL AND CONTROL GROUPS:
SPEECH PAUSE TIME

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Subjects</td>
<td>Pre</td>
</tr>
<tr>
<td>2</td>
<td>5.71</td>
<td>9.99</td>
<td>2</td>
<td>2.05</td>
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<tr>
<td>3</td>
<td>7.98</td>
<td>5.96</td>
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<td>2.65</td>
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<td>4</td>
<td>9.99</td>
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<tr>
<td>5</td>
<td>9.99</td>
<td>1.70</td>
<td>5</td>
<td>8.92</td>
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<tr>
<td>6</td>
<td>9.99</td>
<td>9.99</td>
<td>6</td>
<td>2.60</td>
</tr>
<tr>
<td>7</td>
<td>9.99</td>
<td>9.99</td>
<td>7</td>
<td>9.99</td>
</tr>
<tr>
<td>8</td>
<td>1.86</td>
<td>9.99</td>
<td>8</td>
<td>5.54</td>
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<td>9</td>
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<tr>
<td>16</td>
<td>9.99</td>
<td>9.05</td>
<td>16</td>
<td>1.84</td>
</tr>
</tbody>
</table>

\[ p \geq .60 \]
\[ p \geq .46 \]

* Highest value registered by Voxaflex
TABLE 7

WILCOXON RANK SUM TEST FOR MEAN RANK, STD AND \( p \)-VALUE FOR CHANGE IN EXPERIMENTAL AND CONTROL GROUP: SPEECH PAUSE TIME

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Range</th>
<th>STD Dev.</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>16</td>
<td>16.63</td>
<td>26.48</td>
<td>( p \geq 0.95 )</td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>16.38</td>
<td>26.48</td>
<td></td>
</tr>
</tbody>
</table>

In summary, the data imply that there was no significant difference between the pretest and posttest scores of all groups except the IgA scores for the treatment group. The data also showed that there was no significant change between the experimental and control group scores of IgA, Speech Pause Time and the Patient Opinion Likert test.

Chapter 5 will present an interpretation the results and provide suggestions for further research.
CHAPTER V

DISCUSSION AND IMPLICATIONS

This chapter will discuss the implications of the data, provide an interpretation of the results and present suggestions for further research. It begins by restating the purpose of the study, followed by a review of the null hypotheses and the assumptions upon which they were based. Some of the unexpected problems incurred during the study are also addressed in an attempt to alert future therapists of potential difficulties encountered in this type of research and to suggest alternative strategies. Implications for music therapists regarding the research findings are also discussed.

Review of Purpose and Null Hypotheses

The purpose of this study was to determine whether a single 30-minute music therapy session significantly affected the mood of hospitalized children, as measured by salivary IgA, speech pause time and a patient opinion Likert scale. The writer had observed after 12 years of clinical experience that the mood of subjects appears to be positively affected during and after an interactive music therapy session. But data to empirically substantiate these observations was lacking.

Music was found to be calming to hospitalized veterans during World War II and was widely used in the majority of veteran’s hospitals because of its ability to positively affect the soldier’s mood. Research
within the field of music therapy has found music to be effective in reducing pain perception (Godley, 1987) lessening anxiety, and positively affecting mood (Bailey, 1983a). The treatment for these studies consisted of listening to live or recorded music. However, one of the most unique components of the music therapy process is the interaction between therapist and patient. There appeared then to be a serious need for more experimental research that considered the physiological and psychological changes of hospitalized subjects to both music and the therapist. This study attempts to examine what occurs when hospitalized subjects engage in one interactive treatment session with a music therapist. No studies were found that attempted to empirically measure this. Three measures were chosen to evaluate the subjects' direct and indirect response from a psychological and physiological perspective. It was important that the measures not be intrusive or cause the subject pain, because this would potentially interfere with whatever mood was established during the music session.

There were 12 null and alternate hypotheses in this study. Each of the three dependent variables had 4 hypotheses. The null hypothesis for each variable stated that there would be no significant difference between the pretest and posttest scores of the experimental group or between the pretest and posttest scores of the control group. The alternate hypothesis stated that there would be a significant difference between the pretest and posttest scores of the experimental group or the pretest and posttest scores of the control group. Similarly, the null and alternate hypotheses for each variable tested the difference between the
means of the treatment and control groups for significance. The results of the data in this study were as follows.

Salivary Immunoglobulin A Test

Of the 6 null hypotheses this was only one that was rejected in favor of the alternate hypothesis. Data indicated that there was significant difference (p ≤ .01) in the pretest and posttest scores of the subjects who received treatment. IgA levels significantly increased after a 30-minute music therapy session.

The alternate IgA hypothesis which stated that the pre-test and posttest IgA scores are different was rejected. The small sample size, wide range of scores and uneven distribution of scores may have attributed to this.

Speech Pause Time Test

The null hypothesis stating that there is no difference in the pretest and posttest SPT scores of the treatment group was not rejected, and the alternate hypothesis was rejected. Dysfunctional equipment may have contributed to these findings. As mentioned in Chapter 4, the readings from the voxaflex may also have been faulty due to interference of the overhead paging system, extraneous noise in the subject’s room as well as in the room of the therapist doing the interviewing. When three voxaflexes were placed side by side and an audiotape of a patient’s voice was played, each voxaflex registered a different score. Such discrepancies leave questions concerning the
reliability and validity of the machine. Further testing and refining of the voxaflex is warranted.

The null hypothesis for the speech pause time was not rejected, therefore, the alternate hypothesis was rejected. These results could have been affected by difficulties experienced with the voxaflex.

Patient Opinion Likert Scale

The null hypothesis for the Patient Opinion Likert Scale was not rejected. The alternate hypothesis was rejected. The validity of the Likert measure may be questioned. As previously mentioned the subjects' response may have been tempered by how much they liked or disliked the person who administered the test. Some unrelated situation that happened between the end of the music session and the taking of the Likert test may have also affected the subjects' response.

There was no significant difference found in this data regarding the change between the treatment and control groups. Therefore, the null hypothesis was not rejected and the alternate hypothesis was rejected.

It should be noted that the data resulting from these three measures represent the response of the participating subjects. The procedures and results are presented in detail in order that the study can be replicated to determine its generalizability to other samples. This study is limited in nature, sample size and scope and is to be considered a basis for further research, and not as a conclusive indicator of the
effects of music on the mood and immunological states of hospitalized children.

**Interpretation of Salivary IgA Results**

As discussed in Chapter I, the literature on IgA research indicates a decisive relationship between a positive emotional state and good health as measured by increased IgA levels (Dillon, Minchoff, & Baker, 1985-86). The results of this study appear to agree with this IgA literature. According to the newly established field of psychoneuroimmunology, immune response is not solely determined by autonomic physiological processes, but can be modulated by conscious thought and volition. The writer had repeatedly observed positive changes in behavior, mood and affect in her hospitalized patients during and after music therapy sessions and attempted to find if these changes could be physiologically measured in pre and post samples of IgA. The results of this study appear to be in agreement with Dillon, Minchoff and Baker (1985-86), which showed increased levels of IgA after subjects viewed a humorous videotape. Their study also showed a correlation between increased IgA levels and those subjects who perceived the use of humor as a viable coping skill. The significant increase of IgA shown by the children who received music therapy in the present study may indicate a positive change in mood can similarly be experienced with music.

It is conceivable that the combination of the interaction with the music therapist plays a supportive role in the response of the subjects.
One of primary goals of the music therapy program at University Hospitals is to provide emotional and psychosocial support to its patients. Jemmott, McClelland, Floor, Davidson and Saron (1980) maintain that psychological factors in immunological function are important. Their research demonstrated higher concentrations of salivary IgA in those subjects who had greater social support relative to their needs. Jemmott and Magloire (1988) concluded that social support enhances health outcomes, and their subjects who had greater social support had consistently higher levels of IgA. Physicians, nurses, social workers and Child Life departments in children’s hospitals acknowledge the benefits and necessity of a variety of support systems to provide children with the best care. Music therapy can be considered such a therapeutic modality.

The work of Olness, Culbert and Uden (1988), showed that children can demonstrate a significant increase in IgA after being taught self-hypnosis skills. This implies the immune system is influenced by both volition and the brain. Therefore teaching children to therapeutically use music as a means to enhance their immune function appears reasonable. Because the aforementioned IgA studies reported temporal results, it would be advantageous to determine if music could create long term response if used regularly. This warrants further investigation.

Based on the findings of previous IgA research reviewed in this dissertation and the results of this study, there is evidence that demonstrates a case can be made for the inclusion of music therapy to
assist in the physiological and psychosocial well being of hospitalized children.

**Considerations and Compromises Encountered in This Study**

This section discusses the choice of research design, and considerations and compromises necessary to obtain physiological data that yield empirical results while respecting the intent of the study. A problem regarding the questionnaire used during the monitoring of speech pause time is also addressed.

The question asked in this study was how a 30-minute interactive music therapy session affects a hospitalized child physiologically and psychologically as measured by three selected dependent variables. Two research designs were considered: testing a single group of 40 subjects to obtain pretest and posttest results of a 30-minute music therapy session or testing a control and experimental group of 20 subjects each. In the former model the subjects would act as their own controls, result in a larger sample, and perhaps produce more substantial and clearer results regarding the effects of music. The second model is more frequently used in the medical setting. In addition to the subjects acting as their own controls, this design also allowed comparison between a treatment and nontreatment group, to indicate if indeed it was the music therapy that made the difference. The researcher's intent was that this model would present a somewhat stronger case should the results of the experimental scores significantly differ from the control group. On the other hand, this research design
produced a smaller sample and subsequently less clear results. The fact that there was no significant difference between the means of the experimental and control groups’ IgA scores change posed a problem that might have been eliminated had the former design been used.

Increasing the number of participants in the experimental and control groups may have been a viable alternative to the present number of subjects used in this study. However, time constraints were prohibitive for the researcher, since only 20% of the music therapist’s time was allotted to pediatric patients. Furthermore, the criteria for participation in the study eliminated many of the children for one of several reasons.

Patients who previously had music therapy with the RMT were ineligible in order to control for children who had experienced and formulated opinions about former music sessions. The RMT had been at the hospital for four years and many of the patients had been admitted previously. Those children who were on immunosuppressant drug therapy were not included to control for the counter effects that the drugs may have had physiologically and psychologically. Some of the children were too ill, had severely limited motor function or had a nasal gastric tube which prevented normal speech. Periodically, parents unable to be reached to obtain consent or children were wards of the county and consent was difficult to obtain. Several children could not produce sufficient saliva sample, and many were under or over age.

Conceivably even doubling the number of subjects could have extended the study an additional 4 to 5 months. From both a practical
and administrative perspective this option was not considered acceptable. Other factors the researcher considered in choosing this design were the suggestions from dissertation committee members and the hospital's Investigation Review Board, and expectations of the hospital staff in general. Disruptions were common in this study and occurred during the music therapy session or nontreatment in the form of, impromptu consults with patient and staff, tests, unexpected emergencies, treatments, incoming telephone calls, and visitors for the subjects. Though concessions were repeatedly made by the staff to accommodate the music therapist in this research, many interruptions proved unavoidable and time consuming.

The question of the quality of the IgA samples was addressed in the selection of the physiological measure. There are at least two methods of collecting salivary IgA samples: by having the subject expectorate directly into a vial, or by canulating the perotid gland. The latter procedure would have yielded a purer sample of saliva. Using a canula, or small straw-like implement to stimulate the small glandular pocket inside the mouth of the subject, would have resulted in a saliva sample with less mucous and other secretions in the mouth. The test results then may have been more exacting and indicative of how much the actual saliva was affected. Though this procedure could have been performed by the writer and is not especially painful, it could have been potentially intimidating to the young subjects and detracted from the intended mood of the music session. Therefore, the decision to accept a less pure salivary sample was made for the sake of the subjects’
comfort. Other options for testing immunological changes after music were blood tests obtained by needle aspiration. Obviously this would have caused the subjects' distress though the ability to determine cellular changes in the blood in response to music would have been invaluable data.

Another consideration that may warrant modification is the series of questions asked of the subjects during the telephone conversation while monitoring speech pause time. The questions were constructed to facilitate an easy dialogue between the therapist and subject. The conversation began with simple questions that required factual information such as the subject's grade, age and number of brothers and sisters, and progressed to questions that required more imaginative thought, such as, "Name everything you would buy if you could get anything you wanted at Toys-R-Us?" Some children were more pensive in responding to the latter type of question or could not offer an immediate answer. Invariably this caused delays in answering and affected subject's speech pause time scores. Some subjects responded quickly to the more factual types of questions, while others seemed bored and uninterested in them. The writer was immediately aware that the nature of the question affected the rate, flow and the enthusiasm of the subject's response. In the future to lessen the variability of the subjects' response the music therapist could obtain an informal baseline as to which type of question was most comfortable for the subject to answer.
Primary Assumptions for This Study

The researcher had not counted on several variables that proved difficult to control. When the music activities were described to a number of the subjects, they seemed to respond immediately with excitement. Did the mood change that occurred during the explanation affect the results of the measures? Was IgA elevated before the procedure began in those children who were excited about having music in anticipation of what was to come? Similarly, in those children who were less excited or hesitant, could their pretest IgA scores more realistically have reflected their anticipatory response and rendered the posttest results less accurate? These and questions of a similar nature could be asked for each of the three measures.

The researcher assumed that the Patient Opinion Likert Scale data would reflect how the child felt as a result of treatment or no treatment. Several of the patients were being discharged on the day they participated in the study. Others had just been admitted. Some children were awaiting surgery or had been told a procedure was scheduled after music. These variables and others could have had significant affect on the subjects' mood. The good-bye song, which concluded the treatment sessions, signaled disappointment to some of the children and they cried, asked the therapist to stay longer or expressed dissatisfaction that the session was drawing to a close. The phone conversations (for measuring speech pause time) prior to the treatment could have altered the subject's mood depending on his perception of the questions and whether he enjoyed conversing. It is important to note that these
variables do exist in hospital settings and may be difficult for the researcher to control.

It is clear then that the relationship between positive mood and subsequent physiological and psychological response is inherently difficult to measure. Nevertheless, it is important to further clarify and define these correlations in order to impact the health sciences and benefit patient care.

Suggestions for Further Research

The writer offers to therapists attempting to do similar research or duplicate the present study the following suggestions. The activities chosen were selected because they were a part of the therapist's repertoire that had previously evoked laughter, affirming statements and positive affect from other hospitalized children. These activities are similar to those used by many music therapists who work with groups to facilitate interaction. It is necessary to consider the ethnic and cultural backgrounds of the subjects in choosing the songs and instruments used. The personality and style of the therapist as well as the child are obviously factors that affect the outcome and response of this study. This personal dimension cannot be totally disregarded in research of this nature and therefore the writer suggests the music therapist feel comfortable and reasonably successful with whatever activities are used. The enthusiasm and sensitivity with which the therapist conducts the activities will affect to some degree the response of the subject. It may appear that the subjects will be more interested in
some activities more than others, and the natural inclination of the therapist would be to spend more time on those activities that evoke the most positive response. Though taking liberties of this sort were avoided in the present study, it may prove interesting to investigate how to maximize the subject's enjoyment or positive affect by focusing on those activities he/she appeared to like most. For those children who may be more inclined to movement or motor interaction, longer periods of using instruments or participating in action songs could be substituted for those activities of less interest. Adapting the activities according to the interest, enthusiasm and success of each subject may maximize the potential for enjoyment, but it would be difficult to generalize subjects' response to other populations.

Implications for Further Research

The significant difference (p ≥ .01) found in the comparison of the pretest and posttest IgA scores of the experimental group implies that a 30-minute music therapy session can result in a significant increase in IgA. If a subject's IgA score increases, this may indicate that the inclusion of music therapy in his protocol may assist in playing a positive role in his recovery.

Modern medical technology continues to uncover more about the intricate functions of the human body and more recently is taking a closer look at the relationship between the mind and body in the healing process. Because of escalating costs of medical care and reimbursement policies, it is increasingly important that music therapists justify and
validate their discipline. One of the objectives of this study was to provide empirical data to support the use of music therapy in the hospital setting. The IgA test represents a physiological measure respected by the medical profession. In addition to subjective and observational evaluations of the effects of music therapy, this measure adds yet another marker to substantiate and verify the impact of music therapy on hospitalized patients.

While it is of paramount importance for the music therapy profession to expand its research base, earn increased respect and acceptance within the medical arena and become more objective, cost efficient and accountable, the uniqueness of our profession cannot be reduced entirely to laboratory findings or research results. It is important to the writer that the essence of what music therapists do is reflected in a blend of rigorous research and analysis, coupled with a sensitive regard for the intangible interplay between music and the human body and spirit.
APPENDIX A

SPEECH PAUSE TIME QUESTIONNAIRE

1. How old are you?

2. Do you have brothers or sisters? Tell me about them.

3. Do you go to school?
   Where?
   Describe what you like best at school.
   What’s the worst part about school?
   Do you have art, gym or music?
   Do you have some friends that you especially like at your school?
   Tell me about them.

4. Do you have pets?
   What kinds of fun do you have with it?
   Tell me some of the things you do together.
   If you don’t have a pet what kind would you want if you could have your choice?

5. What television programs do you watch?

6. If you could invite a t.v. star to come to your house, who would it be?

7. What’s your favorite thing to do?

8. If you could go to Toys-R-U's and get everything you wanted, what would you buy?
   Name some things you would buy.
9. What food is your favorite?
   If you could order anything you wanted on a menu for dinner what would you get? And don’t forget to include dessert.

10. Have you ever been on vacation with your family?
    Where would you like to go in an airplane on vacation.
    Choose any place in the world.
    What would you see?
    What would you do there?

11 What sports do you like?
    Do you have any sports heroes that you like?
    Do you play any sports?

12. Have you ever helped cook anything in the kitchen? What?
    How did it taste?
    What would like to learn to cook?

13. What makes you mad?

14. What makes you happy?

15. Do you ever have dreams? What are they about?

16. Do you like reading? Tell me about a story that you’ve read?
    What did you like about it?

17. What do you like most about your family?

18. What are you good at doing? What do you do best?

19. Do you have a boy/girl friend? A very best friend?

20. What makes you laugh?
APPENDIX B

INVESTIGATION REVIEW BOARD CONSENT FORM

45
UNIVERSITY HOSPITALS OF CLEVELAND
PATIENT CONSENT FOR INVESTIGATIONAL STUDIES

TITLE OF PROJECT:

The effects of music on the saliva cationic-globulin A and speech pause time of chronically ill pediatric patients

DESCRIPTION OF STUDIES:

I hereby give consent for my child/daughter ___________________________ to participate in a study to examine how music affects the immune system and a patient's mood. I understand that I am agreeing to allow my child to give two tablespoon samples of saliva, one before and one after he/she receives a thirty-minute music therapy session. I understand that a speech pause time sample will be taken before and after music using a voice meter, which is a small box that measures the length of the pauses between my child's words. This test will involve my child talking continuously for one minute or more. The test will indicate whether my child should be asked to indicate how he/she feels before and after the music session by choosing one of five answers ranging from "great" to "terrible."

I understand that this test procedure will be done one time and take less than one hour. I need not be present during the testing. Appropriate precautions are undertaken for infection, that there are no known risks in taking any of the outlined procedures. However, benefits may include feeling less bored during confinement and improvement in psychological well-being.

Georgia Lane has described to me what is going to be done, how it is going to be done, the risks, hazards and benefits involved, and will be available for a question at ___________________________. I understand that my decision to participate or not to participate in this study will not alter my usual health care. In the use of information generated from this study, my identity will remain anonymous. I am aware that I may withdraw from this study at any time. I further understand that in the event of physical injury or illness occurring to me resulting from the research procedures, University Hospitals will not provide free medical care or compensation for lost wages. Further information with respect to this topic is available from the Office of the Chief of Staff. I understand that by signing this consent form, I do not waive any of my legal rights nor does it relieve investigators or suppliers of liability, but merely indicates that I have been informed about the research study in which I am agreeing to participate. A copy of this form is available to me upon request.

_________________________________________  ___________________________
Signature  Age  Date

Parent or Guardian Signature (if subject is a minor)  ___________________________

Witnessed by  ___________________________  ___________________________
(Signature of Project Investigator)  Date

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APPENDIX C

PATIENT OPINION LIKERT SCALE

Diagram of five faces representing different levels of satisfaction.
REFERENCES


