This is to certify that the

thesis entitled

THE EFFECTS OF MUSIC-ASSISTED RELAXATION THERAPY
ON ANXIETY IN BRAIN INJURY PATIENTS

presented by

Barbara J. Carlisle

has been accepted towards fulfillment
of the requirements for

M.M. degree in Music Therapy

Major professor

Date December 6, 2000

THE EFFECTS OF MUSIC-ASSISTED RELAXATION THERAPY ON ANXIETY IN BRAIN INJURY PATIENTS

By

Barbara J. Carlisle, RMT

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF MUSIC, MUSIC THERAPY

School of Music

December, 2000

ABSTRACT

THE EFFECTS OF MUSIC AND RELAXATION THERAPY

ON ANXIETY IN BRAIN INJURY PATIENTS

By

Barbara J. Carlisle, MT

In working closely with brain injury patients, several authors have observed that following their brain injuries, many patients have exhibited high levels of anxiety, stress and tension (Ellis & Christensen, 1989; Tupper & Cicerone, 1991). The purpose of this study was to determine whether anxiety levels in brain injury patients are significantly reduced, through music and relaxation therapy, as compared to verbal relaxation therapy alone, so as to enable them to physically, emotionally and cognitively function at a higher level that was prevented by high anxiety levels in their nervous systems.

Thirteen brain injured adults, ranging in age from 19 to 64, participated in a music and relaxation therapy versus relaxation therapy study for six sessions. They were divided into two groups: Experimental (music and relaxation therapy) and Control (relaxation therapy without music). A Relax Mood Survey (Miles, 1997) and a Personal Anxiety Report designed specifically for this study, were used to measure the subjects' relaxation and anxiety levels before and after each session.

Results indicated there were no significant differences in reduction of anxiety levels for either the Experimental or Control group in the Mann-Whitney test for the Personal Anxiety Report and for the Relax Mood Survey (Miles, 1997).

Dedicated to the brain injury adults

who participated in this study

and to the

Brain Injury Association of Michigan

ACKNOWLEDGMENTS

I would like to express my gratitude and sincere appreciation to Professor Roger Smeltekop for his support, guidance, and expert advice during this entire project. Also, I thank Dr. Madhav Kulkarni for all of his contributions of expertise, suggestions, and assistance throughout the study. Furthermore, I would like to thank Dr. Fred Tims and Dr. Conrad Donakowski for their positive support and encouragement. All of my committee's inspiration was essential in helping me to succeed.

A special thanks is extended to the brain injury adults who participated in this study, the Directors and other staff members of both Origami Rehabilitation Center and Hope Network and the leaders of the Brain Injury Association of Michigan, Capitol Area Chapter, who provided the buildings and volunteers for this study.

Finally, a very special thank you goes to my family and church friends for providing me with all the personal support, love, and encouragement needed to complete this project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

An Experimental Study

Introduction

Music therapy is a systematic application of music, as directed by a music therapist, in a therapeutic environment to bring about desirable changes in maladaptive human behavior. These changes may enable the individual undergoing therapy to experience a greater understanding of himself/herself and the world around him/her, thus achieving a more suitable adjustment to society. As a member of the professional team, the music therapist participates in the analysis of individual problems and in the projection of general treatment goals before planning and carrying out specific music activities to achieve those goals (Davis, Gfeller & Thaut, 1999).

In an article about the neuro-psychological treatment of mild traumatic brain injury, Kay (1993) has emphasized that in brain injury three major factors (physical, psychological and neurological) interact with each other, affecting one's ability to function. Neurological injury may cause objective cognitive deficits which may directly affect psychological and physical factors, which also may influence each other (e.g. headaches producing anxiety). Emotions tend to be more intense than normal under these conditions. Even mild distractibility tends to cause intense anxiety and fear in a brain injured patient.

In working closely with brain injury patients, several researchers have observed that following their brain injuries, many patients have exhibited high levels of anxiety, stress and tension (Ellis & Christensen, 1989; Tupper & Cicerone, 1991).

In talking with hundreds of brain injury patients in Michigan, as a support group leader, this author has noted that very few of them have been aware of the benefits of music therapy in helping to reduce anxiety, stress and tension levels (Brain Injury Association of Michigan state conferences and local chapter meetings in Michigan, 1997-1999). A 1999 survey of brochures from sixty-four neuro-rehabilitation centers in Michigan (See Appendix A) reveals that less than 8 percent of them offer music therapy in their treatment programs (Carlisle, 1999). Of this small percentage, one offered music therapy in addition to the other therapy programs and several other centers networked with local university music therapy clinics in their communities.

The lack of music therapy services in neuro-rehabilitation centers appears to be a topic of importance because brain injury patients need to find an effective method of releasing the anxiety, stress and tension that builds up easily in their bodies (Maitz, 1994; Code, Muller, Ben-Yishay & Kalin, 1988; Johnson, 1998; Kay, 1993; Richardson, 1990). During the past century, researchers have noted that there is a strong relationship between music and the brain (Clynes, 1982; Collins, 1994). Results from case studies of individuals who sustained specific music impairments after brain injury and of individuals who preserved music processing, despite impaired speech and comprehension of language, have indicated that both cerebral hemispheric areas of the brain are involved in the music process in different ways (Clynes, 1982; Collins, 1994). Other studies have linked the right cerebral hemisphere to processes of emotional intonation of speech (Kay, 1993; Eslinger & Stouffer, 1994). However, since music processing

occurs throughout several areas of the brain, a specific area of the brain injury, or even several sites of brain injury will not prevent potential benefits of music therapy from occurring. Eslinger and Stouffer (1994) have conducted research studies in the Living Unlimited Program of Pennsylvania with brain injury patients using environmental stimulation, music-assisted relaxation for agitation, structured music activities for organizing cognitive skills amidst unfamiliar surroundings, and music expression as a measure of control and harmony in a changing world.

Scartelli (1982) has stated that music-assisted relaxation therapy can be applied to stress and anxiety management to relax muscular tension in the case of spasticity of muscles cerebral palsy patients. This may also be applied to patients with brain injury. Smith and Morris (1976) suggest that by pairing sedative music with stress-producing situations, physiological and emotional arousal may be decreased. According to Miles (1997), relaxing music tends to flow through the nervous system, counteracting the effects of stress on the body by interrupting the negative biofeedback link between the mind and the body.

On the psychological level, music reduces anxiety through such activities as guided imagery and music (GIM) and music-assisted relaxation therapy (Unkefer, 1990; Eslinger & Stouffer, 1994; Hammer, 1996).

Research Question

The purpose of this research study is to determine whether there is a notable advantage to using music-assisted relaxation interventions with brain

injury patients as measured by self-reports of mood and anxiety. The specific purpose of this study is to determine whether anxiety levels in brain injury patients are significantly reduced through music-assisted relaxation therapy, as compared to verbal relaxation therapy alone, so as to enable patients to physically, emotionally and cognitively function at higher levels which were prevented by high anxiety levels in their nervous systems.

Brain Injury

Brain injury refers to an injury in which there is damage to the brain, or at least a disruption of brain function. Symptoms may be transient or permanent. Individuals differ in the degree of severity of their brain injuries and in their response to initial symptoms. Personality and environmental factors interact with the main deficits to determine functional disability. These deficits include:

1. Physical: speech-dysphasia, dysarthria or dyspraxia; hearing and visual defects; paralysis; headaches; seizure disorders; muscle spasticity; and reduced endurance.

2. Cognitive: concentration, attention, perception, planning, communication, writing skills, short-term memory, long-term memory, judgment, sequencing, reading skills, and orientation.

3. Behavioral/Emotional: fatigue, anxiety, low self-esteem, restlessness, agitation, mood swings, excessive emotions, depression, sexual dysfunction, lack of motivation, inability to cope, and self-centeredness. (Brain Injury Association, 1999).

An individual's functional outcome after brain injury is a product of the following factors:

1. Extent of damage to the brain
2. Persistent symptoms of injury to the brain

3. Personality style of the brain injured person
4. Family and social support systems
5. Job and home requirements
6. Age and medical factors
7. Legal status
8. Emergency medical care
9. Quality of post emergency medical care
   (Bellamy & Willard, 1993).

Many patients with brain injury continue to report anxiety problems, both during the recovery period and thereafter (Richardson, 1990). Anxiety may subside within a few days or weeks after the injury; or it may persist beyond the immediate period, particularly in patients who tend to be anxiety prone and those who develop post traumatic stress disorder.

Although anxiety is considered to be a psychological response to some deep-seated conflict or extreme stress, medical researchers have discovered that many patients may be biologically predisposed to anxiety (Davis, Gfeller & Thaut, 1999). In the cerebral cortex of the brain, the temporal lobes may have a specific role in anxiety. Medical studies have shown that fear and anxiety are often associated with temporal lobe pathology (e.g. epilepsy); and they may develop after neurosurgery to remove damaged tissue in the temporal lobe region of the brain (Saric & McLeod, 1993).

Medical issues relative to the various neuro-pathologies that are important to consider in assessing the neuro-behavioral results of brain injury include:

1. Brain tissue effects;
2. Processes that permanently destroy brain tissue versus rendering it temporarily nonfunctional or semifunctional;
3. Primary versus secondary effects of a given brain injury;
4. The longitudinal clinical course of given neuro pathology;

5. The point in the development of the area at which the brain damage occurs; and
6. The cumulative effect of pre-existing disorders. (Tupper & Cicerone, 1991).

The two major classes of brain injury consist of 1) traumatic brain injury (TBI) and 2) closed head injury (CHI). Traumatic brain injury (TBI) is most common in younger adults, with automobile accidents being the most common cause. In 1991, 74% of the total traumatic brain injuries occurred in individuals between the ages of ten and thirty-nine (Tupper & Cicerone, 1991). These injuries are two to three times more common in males than in females (Brain Injury Association of Michigan, 1998). Damage to the brain from accidents result from intense acceleration, deceleration and rotational forces to the brain.

A closed head injury (CHI) is a condition in which numerous potential mechanisms for brain damage exist. A closed head injury can also result from traumas such as acceleration and deceleration injuries. The most common causes of closed head injury are meningitis, encephalitis, strokes, aneurysms and tumors. Severity of the brain damage ranges from mild to severe (Brain Injury Association of Michigan, 1998).

All the difficulties of brain injured patients have a very strong psychological component which may result in either a personality change or emotional distress (Tupper & Cicerone, 1991). Another set of emotional reactions following a brain injury are considered to be typical psychological effects of coming to grips with the catastrophe, rather than stemming from organically based disturbances in brain structure and function. These include

anxiety, fright, helplessness, hopelessness, humiliation, anger, sadness, grief and depression. Emotionally and socially, brain injury patients suffer from lowered self-esteem, feeling envious of others, feeling defeated or dumb, becoming very discouraged, feeling rejected, and at times, wanting to reject or hurt others in turn. (Fordyce, Roueche & Prigatano, 1983).

Factors that influence social skills in brain injury patients may also include a tendency to become more dependent on others; reduction in the amount of personal responsibility taken; tendencies to become more socially withdrawn; problems with social competence; a tendency to blame others for problems; increased impatience; and occasionally, increased agitation. If left untreated, these emotional reactions tend to become worse with time (Fordyce, Roueche & Prigatano, 1983).

Three factors must be taken into account when evaluating a brain injury patient's behavior or personality change: (Fordyce, Roueche & Prigatano, 1983)

1. The nature of pre-injury personality;
2. Organically-based contributions to personality disturbance; and
3. The nature of the individual's emotional reactions to all that has befallen him.

Whether or not these reactions have been therapeutically addressed after the brain injury can also influence the situation. It requires a consistent and fair confrontation in an environment of support, respect and education to help most brain injury patients come to grips with their changes in functioning. This is a long-term process that is very challenging for all concerned: patient, family and medical specialists.

A central need in effective rehabilitation is that members of the professional team recognize and believe that even the most severely brain injured patients may be able to look forward to a potential increase in functional competence. Behavior disorders need treatment through behavior therapy techniques; and the relatively unexplored anxiety disorders affecting brain injury patients should be approached with behavior and other psychological therapies. Achieving the best available outcome for brain injury patients hinges upon providing the best quality rehabilitation therapy. That can be done only with special expertise and with appropriate attitudes in members of the treatment team.

A brain injury can cause deficits that are not cognitive, such as motor or sensory deficits. It is necessary to be aware of the number and range of problems to be confronted and to determine whether these problems are cognitive, bio-chemical, behavioral or emotional by nature. For example, if a brain injury patient exhibits symptoms of anxiety and fear, then it is necessary to know whether these symptoms are emotional, cognitive, or behavioral manifestations of the brain injury or a combination of these factors. Many cognitive problems are intensified by anxiety, fatigue and stress (Wood & Eames, 1989).

Brain Injury and Anxiety

In current experimental research, it is agreed that the effects of situational stress upon cognitive performance are likely to be mediated by the amount of experienced anxiety or state anxiety that is produced by the situation (Richardson, 1990). Spielberger defines state anxiety as "a condition characterized by subjective consciously perceived feelings of tension and apprehension, plus

activation of the autonomic nervous system" (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983, pg. 4).

Anxiety disorders affecting the brain injured patient should be approached with behavior and other psychological therapies which include the combined skills of a physician, social worker, neuro-psychologist, nurse, physiotherapist, speech therapist, occupational therapist, music therapist and recreational therapist.

When faced with tasks or demands that prove too difficult and that render their deficiencies more apparent, brain injury patients may manifest the following responses:

1. They become uncomfortable or flushed.
2. Restlessness may appear heightened.
3. Heart rate and breathing increase.
4. If the offending stimulus is not removed in time, the brain injury patient may momentarily break down in the form of anger, weeping, not talking, or running from the scene. (Tupper & Cicerone, 1991).

The major difference between normal and brain injured patients is that brain injured patients' catastrophic reactions occur with levels of stress and confrontation that normal people would not likely find intensely disturbing. Thus, they appear to over-react easily to stress and demanding situations (Tupper & Cicerone, 1991).

Anxiety

Anxiety is a visceral reaction involving the heart, lungs, colon, stomach and urinary tract. These organs are known as midline responses that are

controlled by the nervous system. When trauma strikes, reactions may include visceral reactions, "butterflies" in the stomach, difficulty in breathing, palpitation, the need to urinate frequently, dizziness, diarrhea, and hyperventilation (Janov, 1991; Miles, 1997).

Sympathetic stimulation in the autonomic nervous system is responsible for anxiety-related circulatory changes in the muscles and skin. Anxiety increases blood flow to the muscles, and it decreases flow to the skin. Sympathetic fibers innervate cerebral blood vessels. In patients who are anxious, it is quite likely that the cerebral blood flow activity is higher than normal. Increased pulse rate and elevation of blood pressure are the most common physiological changes associated with anxiety (Janov, 1991).

Anxiety and fear reactions are connected to the basal ganglia system of the brain (Amen, 1998). The basic functions of the basal ganglia system in the brain are to:

1. Set the body's idle speed or anxiety level;
2. Integrate feelings and movement;
3. Shift and smooth fine motor behavior;
4. Suppress unwanted motor behaviors;
5. Enhance motivation; and
6. Mediate pleasure and ecstasy.

Overactive basal ganglia are associated with anxiety, tension, increased awareness, and heightened fear.

Medical problems associated with the brain's basal ganglia system include anxiety, nervousness, panic attacks, physical sensations of anxiety, tendency to predict the worst, conflict avoidance, Tourette's syndrome, muscle tension,

tremors, fine motor problems, headaches, and low or excessive motivation. Excessive basal ganglia activity tends to reset the body's idle level to a high level that makes people feel anxious, nervous, tense, and pessimistic (Amen, 1998).

Post-traumatic stress disorders tend to manifest themselves in feelings of anger, hostility, frustration, distrust and chronic anxiety. A patient who experiences these feelings tends to be tormented by memories of the past which may have come from the psychological trauma of an automobile accident, pre-surgery fear and anxiety, and other similar sources (Amen, 1998). A patient may never have had the chance to learn how to reset his brain back to normal through the years following these traumatic events.

Amen has recommended the following therapy treatments for basal ganglia disorders:

1. Guided imagery
2. Diaphragmatic breathing exercises
3. Meditation or self-hypnosis
4. Basal ganglia medications
5. Monitoring of dietary habits.

Relaxation Therapy

During the 1920's, Edmund Jacobson developed progressive relaxation therapy to reduce tension, stress and anxiety (Jacobson, 1962; Eddy, 1980). As cassette tape recorders became common in the United States, many relaxation and success-oriented commercial companies developed their own versions of relaxation tapes during the 1960's (Campbell, 1984; DelMaestro, 1984; Halpern, 1976, 1985; & Irwin, 1988).

Music-based individualized relaxation training was

implemented by such music therapists as Saperston of Utah State University (1969). This approach is music-based because music serves a variety of functions during all phases of relaxation training. Training strategies are individualized and task-specific in order to meet the needs of each patient at his particular level of functioning. Through relaxation and music therapy tensions are released physically, neurologically and emotionally. Music that contains a balance of melody, harmony, texture, rhythm, phrasing, volume, timbre and tempo, performed skillfully by the music therapist to induce relaxation, is the best type of music to use (Miles, 1997). The music therapist must be in tune with the feelings of the patient and sensitive to his/her preferences of music styles, reaction to music, cognitive and emotional health, and the ability to handle stress(Bellamy & Willard, 1993). Some brain injury patients, however, may not be able to tolerate music after the injury. It is important to ask the patient to determine individual preferences and tolerance levels before engaging in this type of music therapy treatment.

In brain injury patients, anxiety can produce a type of "closed loop" thinking that makes problem solving almost impossible. Anxiety causes them to go over and over the same thoughts, obsessively. Through introducing music and relaxation therapy to the brain injury patient, this anxiety pattern has been shown to be circumvented (Bush, 1995). During a session of music and relaxation therapy, the patient follows verbal instructions and concentrates on different areas of the body while consciously and unconsciously responding to calm, soft music in the background.

Music has been considered to be an essential therapeutic agent that has the ability to touch people physically, mentally and emotionally, whether or not they are aware of it. The power of music can be traced to influences on the physical aspects of bodily pulsations and the rhythmic beating and pumping of the heart. These physiological changes can be measured in blood pressure, galvanic skin response, and hormone levels (Hanser, 1985). More advanced physiological measures have emerged in the last twelve years that include electromyography, electroencephalography, urinary cortisol and catecholamine levels, and plasma prolactin or adrenaline/noradrenaline concentrations (Robb, 2000). Swiss scientist, Hans Jenny has documented that sound waves give shape to the physical matter of cells, tissues, and organs, thus greatly influencing one's health (Leviton, 1994; Robb, Nichols, Rutan, Bishop & Parker, 1995). In music and relaxation therapy, orchestrated classical music can lead to harmony and well-being on the sensory and physical levels (Miles, 1997).

How can music and relaxation therapy and the therapist help a patient to reach his goal to become anxiety-free, or at least to reduce anxiety levels? It can 1) soften usual defense mechanisms; 2) aid a patient to release all tension, anxiety and stress that has built up in his body and emotionally; and 3) return an individual safely and relaxed to the present (Robb, Nichols, Rutan, Bishop & Parker, 1995). Music with familiar and patient-preferred selections can facilitate relaxation responses in the patient (Robb, Nichols, Rutan, Bishop & Parker, 1995; McCarthy, 1992; Miles, 1997; Robb, 2000).

McCarthy states that activities that include music as background music or to promote a relaxation response include:

1. Deep breathing and progressive muscle relaxation
2. Yoga or gentle stretching to music
3. Guided imagery and music (GIM)
4. Massage therapy with music.

Music selections should be determined by either the music therapist, patient, or both, with the music therapist monitoring which preferred selections would be effective in releasing stress and tension. Such musical selections as Pachelbel's "Canon", the "Moldau" by Smetana, "Halo and Melancholy" (from Kitaro's "Toward the West"), and "The Light in Your Eyes" by Steven Halpern, have been recommended by music therapists (McCarthy, 1992). Harp music and string orchestra albums have also been reported to create a soothing effect on the nervous system and brain wave activity (Miles, 1997).

In order for music to produce relaxing responses in the body, Miles suggests that it must be familiar music that matches a person's current mood, gradually moving toward a state of relaxation that he desires to attain (Miles, 1997). Music should be soft and quiet enough for inner quiet, but just loud enough to surround the listener with tranquilizing sound. Tempos should be similar on each recording as changes in speed, volume or sound can interfere with the relaxation response. While listening to relaxing music, one should sit back or lie down as comfortably as possible. When a person is suffering from stress and anxiety, the right kind of music can slow down the nervous system and enhance the alpha brain wave production for clearer, calmer thought patterns (Campbell,

1997; Weil, 1998; Robb, 2000; Staum & Brotons, 2000). According to Miles (1997) and Weil (1998), it harmonizes the electrical impulses within the mind and body with the sound waves in the air of the outer world; activates the right brain to give the overworked logical left brain area a break; fills the mind to push thoughts away; induces trance; slows down the heart rate, pulse and breathing; and it shifts the brain waves to delta patterns . When tension interferes with physiological and psychological functions, music can interrupt the negative biofeedback loop between the mind and body, giving a person relief from tension.

Assumptions

This study is based upon the following assumptions:

1. The sample used in this study represents adults who are diagnosed with brain injury.
2. Brain injured adults have common characteristics (i.e. anxiety, attention deficit disorder, etc.).
3. Music-assisted relaxation techniques can have a significant influence on brain injured adults.
4. Brain injured adults' responses to music-assisted relaxation have common characteristics.
5. Six forty-minute sessions provide sufficient treatment time to show measurable change, using a music-assisted relaxation design.
6. The Relax Mood Survey self-report (Miles, 1997) is a valid measure of moods in brain injured subjects.

7. The Personal Anxiety Report self-report is a valid measure of anxiety levels in brain injured subjects.
8. Relaxation and anxiety are incompatible responses in brain injury subjects.

Limitations

Factors that may be regarded as limitations of this study include the following:

1. Small sample size of brain injured adults available for the study.
2. Tendency of brain injured adults to drop out half-way through the study, and sudden release from a neuro-rehabilitation facility before the study is completed.
3. Attention deficit disorder in brain injured adults, making it difficult for them to concentrate for long periods of time.
4. The male:female ratio which was 9:4, does limit the generalizability of the results.
5. Various settings in which the study occurred. Attempts were made to match rooms in two neuro-rehabilitation centers according to size, quiet atmospheres and content. One of the settings was in an open room located in a bedroom wing of the center. Patients, staff members and visitors frequently visited out in the adjacent wings, hallways and bedrooms. Television sets and stereos were playing in bedrooms. The other setting was located in the ground level of a neuro-rehabilitation center next to the kitchen and dining room area where staff members and patients frequented. Acoustics and insulation between rooms and hallways were very poor. Subjects could hear

conversations outside the room and people moving around in the hallways upstairs. Windows in both centers had no shades nor curtains to shut out bright lights during each session to promote a more relaxing atmosphere and cut down on visual distractions. It is possible that these distractions limited the brain injured adults' abilities to concentrate on the audiotape and to relax.

CHAPTER II

A REVIEW OF RELATED LITERATURE

Literature covering music therapy with brain injury patients has been limited by two factors: (Faiver, 1988)

1. Music therapy is not fully covered by all medical insurance companies for all patients.
2. Only within the past twenty years has any research been pursued in the field of music therapy for brain injury patients.

Little of this research has been published. Many of the articles provide general information, rather than specific research results in areas such as music and relaxation for brain injury patients.

More research is needed to investigate the relationship among patients with brain injury, music-assisted relaxation therapy, and anxiety problems that occur from brain injury. The specific focus of future research studies should be to determine whether music-assisted relaxation therapy will induce a healing response to such neurologically-induced emotional conditions as anxiety. Once the underlying causes of anxiety can be reduced significantly by this process, other medical problems associated with brain injury could also possibly be treated more successfully.

Music-Assisted Relaxation for Anxiety

In the literature about music-assisted relaxation therapy, the purposes have varied according to the therapists' goals and the types of subjects with which he was working. Strauser (1997) examined the effects of music versus silence on

measures of state anxiety, perceived relaxation and physiological responses of chiropractic patients. Thirty subjects were randomly selected and assigned to one of three conditions. The control group was instructed to relax without music. Experimental Group I listened to a preferred style of music with relaxation instruction. Experimental Group II listened to New Age music with deep-breathing visualization relaxation instructions. All subjects underwent the experimental conditions prior to receiving chiropractic adjustment treatments. Spielberger's State Anxiety Inventory (1983), a ten-point Likert Tension Scale Rating, and blood pressure measurements were administered before and after chiropractic adjustments for each condition. A questionnaire was completed by subjects after the chiropractic adjustments. Results showed although the state anxiety pretest was non-significant, there were significant differences ($p<.05$) between pre-test and post-test scores among the three groups for the State Anxiety Inventory and the Likert Tension Scale Rating. There was no significant difference for physiological measurements (i.e. blood pressure) across all three conditions.

To measure physiological and psychological responses to preferred relaxing music, Davis and Thaut (1989) conducted a study with eighteen females, ages eighteen through forty-three. Physiological data collected included measurements of vascular constriction, heart rate, muscle tension and finger skin temperature.

Individual criteria for selecting music to reduce anxiety and/or to increase relaxation included such factors as preference, familiarity, cultural background, past experiences, and perception of the elements of music (i.e. structure, tempo,

and dynamics). The authors supported the importance of considering clients' unique music preferences and background when selecting music. Subjects were pleasantly excited by their musical selections. The authors concluded that the hedonic tone induced by the music listening experience may have contributed to stimulating feelings of relaxation and reducing feelings of anxiety. These findings are consistent with other studies that support the efficacy of music to reduce anxiety and to enhance relaxation (Greenburg & Fisher, 1972; Hanser, Larson & O'Connell, 1983; Hanser, Martin & Bradstreet, 1982; Jellison, 1975; Rohner & Miller, 1980; Scartelli, 1982). Unlike other studies, however, this research used music listening as the primary stimulus. Results indicated that state anxiety decreased and relaxation increased from the pre-test to post-test conditions consistently across the trials. This change was significant only for state anxiety ($p<.05$). Physiological data showed that music aroused, rather than soothed, autonomic and muscular activity.

In another study by Thaut and Davis (1993), the authors examined the influence of subject-selected versus experimenter-chosen music on affect, anxiety and relaxation. Fifty-four subjects (25 males and 29 females), ages eighteen through thirty-three, were randomly selected to participate. Music consisted of subject-selected music and experimenter-chosen music. Both types of music were selected on the basis of claims that the music was composed specifically to relieve tension and to increase relaxation. Subjects were assessed, psychologically, through the use of the Spielberger State Anxiety Inventory and the Multiple Affective Adjective Checklist (MAACL) and a visual analog scale. In two of the

three measures (Spielberger (1983) State Anxiety Inventory and the visual analog scale), significant relaxation responses were achieved by subjects in all three experimental conditions with the subjects in the two experimental groups receiving fifteen minutes of uninterrupted music and those in the control group sitting quietly for fifteen minutes. Neither the presence nor absence of music nor the choice of music appeared to make any difference in the relaxation responses. MAACL revealed that depression scores did not change under any of the three conditions, while all subjects reduced their hostility scores regardless of the condition.

In a study by Hammer (1996), sixteen subjects from the University Good Samaritan Center participated in guided imagery and music therapy (GIM) to determine whether or not the GIM training would have an effect on perceived stress levels. Spielberger's (1983) State-Trait Anxiety Inventory and individual self-reports were used for dependent measures. The experimental groups received ten GIM treatments while the control group received no GIM treatments. Results showed that the experimental group showed a decrease in perceived situational stress (state anxiety) while the control group showed a slight reduction. An analysis of the data indicated that differences in state scores between the two groups were statistically significant. Verbal reports and observations from the experimental group subjects also supported these findings. All subjects in the experimental group reported a marked reduction in perceived stress and anxiety following the treatment. Results indicated that GIM may be of some benefit to persons dealing with chronic stress and anxiety (Hammer, 1996).

Although Hammer's study indicated that guided imagery and music may be of benefit to persons dealing with chronic stress and anxiety, this requires verbal feedback exchange between the participants and the therapist, something which many brain injury patients may have difficulty providing to the therapist. There is a possibility that brain injury patients may benefit from GIM therapy as long as they are able to freely express themselves without hesitation in response to the therapist's questions.

Byrnes (1996) conducted a study designed to measure subjects' ongoing experienced levels of stress as they received audio, video or combined audio-video stimuli. Subjects used the Continuous Response Digital Interface (CRDI) with a graphic overlay previously developed in a study on musical tension to approximate their level of stress prior to receiving treatment, as well as to register varying levels of stress during treatment. Stimulus used included an excerpt from a classical music video, entitled "Aquarium", by Saint-Saens. The visual stimuli was an underwater filming of tropical sea life. Subjects were asked to complete a questionnaire in which they described the kind of music they listened to for relaxation and other relaxation activities they engaged in. They also recorded their perceived levels of stress, their familiarity with and enjoyment of the excerpt presented.

Results of all three conditions were that:

1. Levels of stress were relatively low; and
2. For individuals recording initial high levels of stress, the music tended to decrease stress levels, somewhat.

There was no significant difference between beginning and ending stress responses for the audio and video conditions. However, there was a significant difference between the beginning and ending stress responses for the combined audio-video conditions. No condition seemed to be preferred over any other one. Classical, jazz/blues, easy listening and pop music were most often quoted as the types of music used for relaxation. Sports and reading were most often quoted by the subjects as stress-reduction activities.

Ikeda and Iwaki(1996) conducted a study to determine the effects of repetitive exposure to music on subjective and physiological responses. Twelve undergraduate and graduate behavioral science students participated. Two musical selections were played: Stravinsky's "Sacrifice Dance" from the *Rite of Spring* for the stimulative music; and Satie's Gymnopedie #1" (orchestra version) for the sedative music. Physical responses to the music were perceived as consistently higher for the stimulative selection than for the sedative one. Subjects reported consistently high levels of relaxation and low tension, while listening to sedative music in contrast to stimulated feelings while listening to stimulative selections of music. They also reported that relaxation increased with repeated listenings. Heart rate and respiration rates did not change during the stimulative music; but they gradually decreased during the sedative music. Results indicate that the sedative effects of music were more apparent in the second half of both pieces.

In a research study by Robb (2000), the effects of music assisted muscular relaxation (M+PMR), progressive muscle relaxation (PMR), music listening (ML)

and silence/suggestion(s) on measures of state anxiety and perceived relaxation were compared to determine which method was most effective in reducing anxiety and promoting relaxation responses. Sixty students, ranging from 19 to 35 years were tested individually in a university Music Research Lab. Four groups were formed consisting of 15 students each (M+PMR, PMR, ML and S). A private room was furnished with a padded bed, and adjustable headrest, a portable stereo and tapes. Daniel Kobialka's "Going Home Medley" was selected, based upon the criteria that music should have a tempo of 72 or less to coincide with a resting heart rate, predictable dynamics, fluid melodic movement, pleasing harmonies, smooth, regular rhythm and tonal qualities that include strings, flute, or piano (Robb et al., 1995).

The Spielberger State Anxiety Inventory (STAI) (Form &-1, Spielberger, 1983) was selected to assess state anxiety levels. To measure perceived relaxation levels, a visual analog scale (VAS) (Thaut & Davis, 1993) was used with the right anchor of the scale indicating a "completely relaxed" state and the left anchor indicating a "completely unrelaxed" state. Participants measured their state of relaxation by marking a point along the line prior to experimentation and at the end of testing. Distance from the left anchor was measured in millimeters; and pre and posttest differences were compared for significant changes.

Group 1 (PMR) participants followed an audio taped progressive muscle relaxation exercise for 15 minutes. Group 2 (M+PMR) received a combination of music and progressive muscle relaxation, using Daniel Kobialka's "Going Home Medley". Group 3 (Music) received audio taped directions to find a comfortable

position and relax while listening to Daniel Kobialka's "Going Home Medley" for 15 minutes. Group 4 (Silence) participants were instructed to relax for 15 minutes of silence. Prior to and following each session, participants completed the STAI and VAS as pretest and post measures of anxiety and perceived relaxation, and a posttreatment questionnaire.

Results indicated that although significant differences were not found among the groups, mean score differences revealed that M+PMR had the greatest impact, followed by PMR, music listening and silence groups. The M+PMR participants were reported to have had lower levels of anxiety and higher levels of perceived relaxation than participants in the other three groups.
Data from this study supported the use of music and progressive muscle relaxation is an effective relaxation intervention.

While none of the research articles focused on music and relaxation for brain injury patients, they did point out that sedative music is more effective than stimulative music in inducing the relaxation response in the choice of music. More recent studies have indicated that "New Age" music seems to have a more calming affect than sedative music (Staum & Brotons, 2000).

In the study by Strauser (1997), three different methods of inducing relaxation responses were compared for their effectiveness in reducing tension and anxiety prior to chiropractic adjustments. All three methods (i.e. relax in silence; listen to a preferred style of music with relaxation instruction; and listening to New Age music with deep-breathing visualization relaxation instruction) proved effective in relaxing the subjects from tension. Music and

relaxation methods combine relaxation with soft, calm music to reduce anxiety and tension levels, which would be similar to what the Experimental Group 1 received in the current study.

In Davis and Thaut's (1989) study to measure physiological and psychological responses to preferred relaxing music, the subjects' preferred music played an important role in influencing their ability to relax to the music. However, in a later study in 1993 by the same authors, in which subject-selected and experimenter-chosen music were compared on affect anxiety and relaxation, neither the presence nor absence of music nor the choice of music appeared to make any difference in the relaxation response. The reader must understand that the subjects involved in each study were not patients suffering from anxiety and stress, but that they were normal people who had volunteered to participate in the study. The absence of high levels of anxiety and stress during the studies may have influenced the results.

Music Therapy-Brain Injury

During the twentieth century, numerous research studies have been conducted for brain injury patients. However, the majority of them have focused on cognitive, physical, speech, personal hygiene skills, and emotional benefits of music therapy, using songs, rhythm instrument activities and other related methods. One article by Lucia (1987) of DePaul University has focused upon developing a model of music therapy intervention in the rehabilitation of brain injury patients. Melodic Intonation Therapy and music therapy-facilitated motor rehabilitation were evaluated for their effectiveness in meeting the goals of

aphasia rehabilitation strategies and motor skills. Nothing is cited about the need for music and relaxation therapy to reduce the anxiety and tension levels which are quite common in brain injury patients.

In a research study by Goldberg, Hoss and Chena (1988), the authors challenged the theory that "due to short-term memory loss, brain injury patients are not good candidates for guided music and imagery (GIM) therapy." A forty-one year old brain injured female was given GIM in which she engaged with the music and imagery, and was able to work through some issues. Although the case study was not conducted long enough to determine whether the treatment had a lasting effect, the case has suggested that with closed brain injury patients, this could be a viable approach to the psychotherapy of brain injury patients.

In an article about music therapy for brain injury patients by Magee (1999), two different approaches are presented to emphasize the flexibility that is needed by music therapists to work in a setting of traumatic brain injury (TBI) patients in a medical setting. In a case study with one patient, music therapy was used to help him regain his speech, following an automobile accident. Goals were broken down into small segments that were attainable for him, using a neuro-rehabilitation model with pre-composed music. Music served both an adjunctive role in his communication rehabilitation and a primary role in his emotional rehabilitation.

In the second case study, the subject was a male who had sustained very severe anoxic brain damage following a cardiac arrest. He was severely physically disabled; and he suffered from dysarthria, oral dyspraxia and language

problems. He exhibited agitated and confused behavior that affected his ability to relate to others. Music therapy sessions were conducted in his bedroom or another quiet space on the ward. Music therapy activities consisted of instrumental playing; but this had to be abandoned as they were unrealistic due to visual difficulties. Vocalization activities were used with specific speech sounds and single words. Little improvement was made in these activities. None of the initial functional goals were reached at the beginning of his therapy sessions with the instrumental activities. However, by using a more flexible and less goal-oriented approach with vocal improvisation, music therapy provided an improved quality of interaction in human relationships.

In a research study by O'Callagham (1999), the author has cited research studies with brain injury subjects that have focused on the effects of music therapy activities in retrieving song lyrics or well-known music when patients have word finding difficulties and aphasia. The pre-existing musical skills that remained preserved in the event of brain injury enabled the subjects to experience enjoyment and a sense of achievement, in spite of the severity of their injuries.

In a research article by Claeys, Miller, Dalloul-Rampersad and Kollar (1989), the authors have focused on the importance of using improvisation in music therapy to stimulate alerting responses, oral motor movements, changing facial expressions and vocalizations in traumatic brain injury (TBI) patients who were in the coma state of their brain injury. Cognitive functioning levels and the Rancho Scale Levels of Client Achievement (see Appendix H) were used to

evaluate the music therapy goals. A wide variety of music therapy activities are listed, including songs improvised to identify clothing, random movements and vocalizations, the weather, the place, the date, and the time, at Level III of the Rancho Scale. In Levels IV -VI, patients count or sing with live music to enhance their speech therapy goals. For Levels VII and VIII, programs similar to earlier levels are used to address physical, cognitive and communication goals. However, none of these activities and goals deal directly with the effect of music and relaxation listening activities to help reduce anxiety and tension levels.

In all of the brain injury and music therapy literature, the majority of articles have focused upon music therapy for traumatic brain injury (TBI) patients. The only treatment that is similar to the music-assisted relaxation therapy in the literature review was the article by Goldberg, Hoss and Chesna (1988) in which guided imagery and music (GIM) therapy was used as psychotherapy with a TBI patient. No articles were found that focused on music-assisted relaxation therapy for closed head injury (CHI) patients.

CHAPTER III

METHOD

Purpose

The purpose of this study was to gain information regarding the relationship of music and relaxation as they influence the reduction of anxiety levels in brain injury patients. The specific problem of this study was to determine whether anxiety levels in brain injury patients were significantly reduced, through music-assisted relaxation therapy, as compared to verbal relaxation therapy alone, so as to enable patients to function at physical, emotional and cognitive levels that may be prevented by high anxiety levels in their nervous systems.

Subjects

Thirteen brain injury adults (8 males and 5 females) were selected for this study. Selection was made by contacting two neuro-rehabilitation centers in Ingham County and members of the Brain Injury Association of Michigan, Capitol Area Chapter. Out of the total thirteen subjects found, three were patients of one residential rehabilitation center, four were patients of a second residential rehabilitation center; and six brain injury adults were living at home.

All of the subjects were diagnosed as "brain injured" according to the provisions set forth by the Brain Injury Association of Michigan (1999) and ranged from traumatic to mildly impaired. Correlations that were run according to gender revealed that there were eight males (62.5%) and five females (37.5%) ranging in age from nineteen to sixty-four years with the average age being forty.. All of the subjects were Caucasian. Seven were survivors of traumatic brain injury and

six had a closed head injury. Seven subjects reported the cause of their brain injuries was from an auto accident. The other six subjects's causes of brain injury included a bicycle accident, physical fall, stroke, and tumor.

Consent and Approval

Following approval by the thesis committee, approval to implement the research study was secured from the Michigan State University Committee on Research Involving Human Subjects (Appendix J). The research proposal was then sent to the Origami Rehabilitation Center, Hope Network, and PAR Rehabilitation Services for approval (Appendix D) . The proposal was approved by all three of the rehabilitation centers; and the experimenter was notified of these decisions through a formal interview with the Directors and by telephone. Subjects came from the Origami Rehabilitation Center, Hope Network, and the Brain Injury Association of Michigan, but no subjects came from PAR Rehabilitation Services.

Once approval was granted to begin research, the subjects were selected, and the procedure to gather informed consent from subjects, their guardians, and medical authorities from each of the rehabilitation centers was implemented. Consent was granted from all of them to have the subjects participate.

Materials

The following musical materials were utilized in the treatment procedure: a portable stereo (Vox cassette recorder CTR-117), an audio taped relaxation script (Griswold & Carlisle, 1999), and an audio taped music and relaxation script (Griswold & Carlisle, 1999) using Davison's "Adagio" (1998). The testing

environment consisted of tables and chairs in a large room. Pillows and blankets were furnished by the experimenter for subjects who chose to lay down on the floor to enhance the relaxation process.

The study was conducted at four different settings: two neuro-rehabilitation centers and two homes, twice a week. All four rooms were similar in size and content.

Design

The overall design was to study the relationship between the variables of relaxation therapy with no music-assisted relaxation therapy with music, using seven brain injury subjects in an experimental group and six brain injury subjects in a control group. For the experimental group the level of anxiety reduction was the dependent variable with music-assisted relaxation therapy being the independent variable. For the control group, the level of anxiety reduction was the dependent variable; and relaxation therapy without music was the independent variable. Personal Anxiety Reports (an experimenter designed rating instrument) and the Relax Mood Survey, adopted from Miles (1997) were used to determine if any significant changes occurred as a result of this intervention.

Procedure

Thirteen brain injury patients (9 males and 4 females), ages 19 to 64, who had been referred for relaxation therapy, participated in this research study. Two groups were formed with seven in the Experimental and six in the Control group. Relaxation therapy sessions were conducted twice a week for three weeks with

each session lasting for forty minutes. Relaxation therapy was audio taped and played in both groups. All participants were given a music therapy survey form (see Appendix E) to fill out prior to the research study.

Experimental Group

Seven participants in the experimental group received forty-minute sessions, twice a week, for three weeks, in two neuro-rehabilitation clinics and two private homes. The therapist introduced the study, explained the music-assisted relaxation therapy procedure, and delineated goals for each session during the first session. During the remaining five sessions, the therapist had participants fill out a Personal Anxiety Report (see Appendix F) and a Relax Mood Survey (see Appendix G) prior to each music and relaxation therapy session.

In each session the therapist instructed participants to sit in a chair or lie down on a small blanket on the floor to promote the effects of music and relaxation therapy. A combination of the relaxation script and "Adagio" (Davison, 1998) was played on a tape recorder (See Appendix B), followed by twenty minutes of music only. At the end of each music and relaxation therapy session, participants were instructed to gradually awaken in the following manner: "Awaken gradually, now, as I count to five. One--your attention is gradually returning to your surroundings. Two--you are aware of the sounds around you. Three--you are feeling refreshed, relaxed and stress-free. Four--you are aware of the other people in the room with you. Five--you are totally awake and ready to go forth to face the challenges of this day with ease" (Griswold,

1975 & Carlisle, 2000, p. 36). After each music-assisted relaxation therapy session, participants filled out the Personal Anxiety Report and Relax Mood Surveys a second time. The therapist compared responses to the pre-session and post-session Personal Anxiety Reports and Relax Mood Surveys to determine if the anxiety levels of each participant were different following each music-assisted relaxation therapy session. Pre-session and post-session Personal Anxiety Reports and Relax Mood Survey sheets were printed on different color sheets as follows: Personal Anxiety Reports: Pre-session, gold sheets; Post-session, green sheets (See Appendix F); and the Relax Mood Survey: Pre-session, blue sheets; Post-session, pink sheets (See Appendix G).

Control Group

Six participants in the control group received six forty-minute sessions of relaxation therapy, twice a week in two neuro-rehabilitation clinics and one home. During the first session, the therapist introduced the study, explained the relaxation therapy procedure, and delineated goals for each session. Participants in the control group filled out a Personal Anxiety Report (see Appendix F) and a Relax Mood Survey (see Appendix G) prior to and following each relaxation therapy session.

During the second session, participants were instructed to sit in a chair or lie down on a small blanket on the floor to promote the effects of relaxation therapy. Participants listened to an audio taped relaxation script in which they were instructed to relax for twenty minutes (see Relaxation script in Appendix B). At

the end of the twenty-minute session, participants had a period of silence for another twenty minutes, after which they were instructed to gradually awaken in the following manner: "Awaken now, gradually, as I count to five. One--your attention is gradually returning to your surroundings. Two--you are aware of the sounds around you. Three--you are feeling refreshed, relaxed and stress-free. Four--you are aware of the other people in the room with you. Five--you are totally awake and ready to go forth to face the challenges of this day with ease " (Griswold, 1975 & Carlisle, 1999, p.36).

After each relaxation therapy session, participants filled out the Personal Anxiety Report (See Appendix F) and the Relax Mood Survey (See Appendix G) a second time. The therapist compared responses to the pre-session and post-session Anxiety Reports to determine if the anxiety levels of each participant in the control group were reduced, following each relaxation therapy session. Pre-session and post-session Personal Anxiety Reports were printed on different color sheets as follows: Pre-session, gold sheets; Post-session, green sheets. The Relax Mood Survey sheets were printed on different color sheets as follows: Pre-session-blue sheets, Post-session, pink sheets.

Analysis

To determine whether relaxation therapy or music-assisted relaxation therapy affected a decrease in anxiety levels of each participant, responses of the experimental and control group participants were compared, using the Mann-Whitney U's test to see if either group changed from the pre-test to the post-test. The Personal Anxiety Scale and the Relax Mood Scale results were analyzed

statistically to determine if there was any significant difference in the levels of anxiety and relaxation among participants in both groups. Pearson correlations were also run according to age to determine if this factors influenced the results in any way.

CHAPTER IV

ANALYSIS OF DATA

Data were analyzed using graphic analysis and non parametric statistical techniques. Justification for the use of non parametric statistical tests was made for three reasons. The first reason was the small sample of subjects that participated in the study. The second reason was that the level of measurements used in data collection was ordinal. The third reason was that the subjects in this study could not be assumed to represent a normal population distribution.

The experimenter selected the .05 level of significance as the criterion for this study. All non parametric statistics were calculated using formulas and tables from Healey's (1999) *Statistics: A Tool for Social Research.*

Results

Relaxation levels were scored using the Relax Mood Survey (Appendix G), by Elizabeth Miles (1997). Means for the Experimental and Control groups were calculated for each group as a whole (N= 7: Experimental and N=6: Control). The two-sample Whitney-Mann test was used to measure pre- and post-session levels of relaxation. No significant difference was noted between the two groups. Using a scale of one to ten, subjects were instructed to rate their levels of relaxation using such words as "calm, loose, breathing easily, quiet, unwound, tranquil, soft, composed, mellow and serene" with one being the lowest and ten being the highest level. Thirty-five percent of the subjects tended to use the same number for all ten words in each session both in the pre- and post-

survey forms, raising the question as to whether they were able to comprehend the meaning of each word accurately. Others displayed difficulty in clearly focusing on the post-survey form rating task, as they had fallen asleep during the relaxation tape and had to be awakened by the therapist after each session.

Anxiety levels were scored using a Personal Anxiety Report (Appendix F) which was constructed by the experimenter. The scores were plotted graphically across sessions for each subject for pre- and post-treatment scores (Appendix J). The two-sample Whitney-Man test revealed that there were no significant differences between the experimental and control groups when change scores were compared.. Individual graphic scores (Appendix K) indicated that there was a decrease in the anxiety scores of three subjects. Subject B in the Experimental Group tended to score from 7 to 10 (tense to stressed out) in each pre-session contrasted by a score of 0 to 1 (calm) in each post-session. Subject C in the Control Group averaged a pre-session score of 6 (tense) contrasted by a post-session score of 0 (calm). Subject E in the Experimental Group rated pre-session anxiety levels in the calm (0-2) to mildly nervous (2-3) range contrasted by a post-session score of very calm (-1 to -5). All remaining subjects' scores differed only one to two points lower in their post-session ratings.

Tables 1 through 6 show pre- and post-session anxiety level scores across six sessions for the Experimental (Tables 1-3) and Control (Tables 4-6) groups. Overall anxiety reduction was determined by the sum of the first two sessions minus the sum of the last two sessions. For Table 1 and Table 4, a high score on

the reduction column meant lower pre-treatment anxiety levels over time or across sessions. It would suggest that the sessions may have been helpful in reducing the subjects' pre-treatment anxiety. For Table 2 and Table 5 in the post-test scores, a high score in reduction would mean that the subjects were leaving the session feeling generally more relaxed in the later sessions (near the end of treatment) than they were at the beginning of treatment. In sessions 3 and 4 of the tables, the post-treatment scores in the negative range indicate that they felt more relaxed.

Table 1. Anxiety level **pre-treatment** scores for each subject across six sessions for the Experimental group.

Subject	1	2	3	4	5	6	Reduction in overall pre-treatment Anxiety level
A	1	1	1	1	1	0	1
B	1	8	7	9	5	3	1
C	3	2	2	4	5	7	-7
D	5	6	4	5.5	2.5	1.5	7
E	2	0	1	2	.5	0	1.5
F	8	8	0	3	10	8	-2
G	2	2	1.5	2.5	1.5	1	1.5
							Mean = 0.43

Overall anxiety reduction was determined by the sum of the first two sessions minus the sum of the last two sessions.

Table 2. Anxiety level **post-treatment** scores for each subject across six sessions for the Experimental Group.

Subject	1	2	3	4	5	6	Reduction in overall pre-treatment Anxiety level
A	0	1	1	1	.5	0	.5
B	0	1	1	0	1	0	0
C	2	1	1	3	3	6	-6
D	2	3	2	1.5	1	1	3
E	0	-3	-.5	-.5	-.5	0	-2.5
F	8	10	3	6	10	10	-2
G	2	1	.5	.5	0	0	3
							Mean = -.57

Individual overall anxiety reduction was determined by the sum of the first two sessions minus the sum of the last two sessions.

A means of -.57 suggested that when the subjects left the sessions, they felt more anxious. This may have been due to Subject C's increase in anxiety level which threw off the group average.

Table 3. Differences in Anxiety Scores between Pre-Sessions and Post-Sessions for **Experimental Group**

Subject	1	2	3	4	5	6	Mean
A	1	0	0	0	.5	0	.25
B	1	7	6	9	4	3	5.00
C	1	1	1	1	2	1	1.17
D	3	3	2	4	1.5	.5	2.33
E	2	-3	-.5	1.5	0	0	0
F	0	-2	-3	-3	0	-2	-1.67

Mean = 1.17

No significant differences were found between pre-sessions and post-sessions in the anxiety scores of the Experimental Group.

Table 4. Anxiety level **pre-treatment** scores for each subject across sessions for the **Control group**.

Subject	1	2	3	4	5	6	Reduction in overall pre-treatment Anxiety level
A	0	2	2	2.5	2	4	-4
B	2	0	3	0	1	2	-1
C	3	4	6	6	6	9	-8
D	6	7	7	7	5	6	2
E	5	5	3	2	1	3	6
F	2	3	6	3	3	4	-2
							Mean = -1.2

Individual overall anxiety reduction was determined by total score of the first two sessions minus total score of the last two sessions.

Table 5. Anxiety level **post-treatment** scores for each subject across six sessions for the **Control** group.

Subject	1	2	3	4	5	6	Reduction in overall pre-treatment Anxiety level
A	-2	1	0	1	1	1	-3
B	2	1	1	1	0	.5	2.5
C	0	-5	-5	1	.5	6	-11.5
D	5	5	5	5	4	4	2
E	1	0	0	0	0	0	1
F	1	1	1	1	1	1	0
							Mean = -1.5

Individual overall anxiety reduction was determined by the sum of the first two sessions minus the sum of the last two sessions.

Table 6. Differences in Anxiety Scores between Pre-Sessions and Post-Sessions for **Control Group**

Subject	1	2	3	4	5	6	Reduction in overall pre-treatment Anxiety level
A	-2	1	2	1.5	1	3	1.08
B	0	-1	2	-1	1	1.5	-.58
C	3	-1	1	5	5.5	3	2.75
D	1	2	2	5	5	6	2
E	5	5	3	2	1	3	6
F	2	3	6	3	3	4	-2

Group Mean = 1.82

No significant differences were found between the pre-sessions and post sessions in the anxiety scores of the Control Group.

To determine if there was any significant difference between Experimental and Control groups' scores for the Anxiety Survey, a Two-sample Mann-Whitney test revealed no difference as illustrated in Tables 7-8.

Table 7. Two-sample Mann-Whitney test for **Anxiety Level** in the Pre-Session Surveys.

	N	Mean Rank
Experimental	7	6.57
Control	6	7.50

U=18.0 p-value = -.420

Table 8. Two-Sample Mann-Whitney test for **Anxiety Levels** in the Post-Session Surveys.

	N	Mean Rank
Experimental	7	7.57
Control	6	6.33

U = 17.0 p-value = -.571

To determine if there was any significant difference between the Experimental and Control groups' scores for the Relax Mood Survey, a Two-sample Mann Whitney test revealed no difference as illustrated in Tables 9-28.

Table 9. Two-sample Mann-Whitney test for **Calmness** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	6.79
Control	6	7.25

U=19.5 p-value = .418

Table 10. Two-sample Mann-Whitney test for **Calmness** in the Post-session surveys.

	N	Mean Rank
Experimental	7	8.21
Control	6	5.58

U=12.5 p-value = .117

Table 11. Two-sample Mann-Whitney test for **Loose** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.64
Control	6	6.25

U=16.5 p-value = -.645

Table 12. Two-sample Mann-Whitney test for **Loose** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.79
Control	6	6.08

U=15.5 p-value = -.787

Table 13. Two-sample Mann-Whitney test for **Breathing Easily** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	6.93
Control	6	7.08

U=20.5 p-value = -.072

Table 14. Two-sample Mann-Whitney test for **Breathing Easily** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.14
Control	6	6.83

U=20.0 p-value = -.143

Table 15. Two-sample Mann-Whitney test for **Quiet** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.50
Control	6	6.42

U=17.5 p-value = -.501

Table 16. Two-sample Mann-Whitney test for **Quiet** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.29
Control	6	6.67

U = 19.0 p-value = -.287

Table 17. Two-sample Mann-Whitney test for **Unwound** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.43
Control	6	6.5

U = 18.0 p-value = -.429

Table 18. Two-sample Mann-Whitney test for **Unwound** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.79
Control	6	6.08

U = 15.0 p-value = -.78

Table 19. Two-sample Mann-Whitney test for **Tranquil** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	8.14
Control	6	5.67

U = 13.0 p-value = -1.14

Table 20. Two-sample Mann-Whitney test for **Tranquil** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.43
Control	6	6.50

U = 18.0 p-value = -.43

Table 21. Two-sample Mann-Whitney test for **Soft** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.57
Control	6	6.33

U = 17.0 p-value = -.573

Table 22. Two-sample Mann-Whitney test for **Soft** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.43
Control	6	6.50

U = 18.0 p-value = -.43

Table 23. Two-sample Mann-Whitney test for **Composed** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.29
Control	6	6.67

U = 19.0 p-value = -.287

Table 24. Two-sample Mann-Whitney test for **Composed** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.50
Control	6	6.42

U = 17.5 p-value = -.501

Table 25. Two-sample Mann-Whitney test for **Mellow** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.50
Control	6	6.42

U = 17.5 p-value = -.502

Table 26. Two-sample Mann-Whitney test for **Mellow** in the Post-session surveys.

	N	Mean Rank
Experimental	7	7.36
Control	6	6.58

U = 18.5 p-value = -.358

Table 27. Two-sample Mann-Whitney test for **Serene** in the Pre-session surveys.

	N	Mean Rank
Experimental	7	7.21
Control	6	6.75

U = 17.0 p-value = -.573

Table 28. Two-sample Mann-Whitney test for **Serene** on the Post-session surveys.

	N	Mean Rank
Experimental	7	7.57
Control	6	6.33

U = 17.0 p-value = -.571

Although there was a small difference between the Experimental and Control groups, there was no significant difference, since the p-value was greater than .05.

Anxiety and Age Factors

Correlations were run according to age revealed that 62.5% were males and 37.5% were females. Ages ranged from nineteen to sixty four with the average age being forty. The following questions were raised as to whether or not age factors influenced scores in Relax-Mood and Anxiety surveys:

1. Do anxiety levels increase with age?
2. Do relax-mood levels decrease with age?

Pearson's non parametric correlation test was used to determine the significance of age in influencing both anxiety levels and relax-mood levels. Table 29 shows pre-and post-session anxiety and relax-mood correlations between the Experimental and Control groups.

Table 29. Correlation Coefficient with Age between the Experimental and Control Groups.

Relax-Mood Survey	EXPERIMENTAL GROUP		CONTROL GROUP	
	Pre-Session	Post-Session	Pre-Session	Post-Session
Calm	-.4851, p=.270	-.236, p=.610	-.3713, p=469	-.1699, p=748
Loose	-.573, p=.179	-.3695, p=.415	.0328, p=.951	-.2019, p=.701
Breathing Easy	-.5549, p=.196	-.5303, p=.221	-.2845, p=.585	-.0841, p=.874
Quiet	-.5141, p=.23	-.5091, p=.243	.0237, p=.964	-.1533, p=.772
Unwound	-.6246, p=.134	-.4052, p=.367	-.0279, p=.958	-.2156, p=.682
Tranquil	-.5358, p=.215	-.4307, p=.335	.5052, p=.307	-.1249, p=.814
Soft	-.4010, p=.373	-.4359, p=.331 2	.1135, p=.830	-.1453, p=.784
Composed	-.4656, p=.292	-.4491, p=.312	.0806, p=.789	-.176, p=.739
Mellow	-.4984, p=.255	-.4883, p=.266	-.0895, p=.866	.0702, p=.895
Serene	-.5281, p=.223	-.4549, p=.305	-.0404, p=.939	-.1621, p=.759
Anxiety Survey	.2578, p=.577	-.2509, p=.587	-2268, p=.666	-5805, p=.227

Results showed that there was no significant difference between the factors of age and levels of anxiety in either the Experimental group or the Control group (Anxiety Survey, Table 29). The Relax-Mood survey showed little correlation between the levels of relaxation and age factors (Relax-Mood Survey, Table 29).

Although the statistical results did not support the predictions made earlier, anxiety levels measured on line charts (Appendix K) and verbal feedback from the subjects reveal that many of them did begin to experience anxiety reduction in six sessions of music-assisted relaxation therapy. The general trend showed that anxiety levels dropped from one to three points with a maximum of nine points. In the Control group, Subject F showed a very erratic response throughout the six sessions where the anxiety levels increased after listening to the relaxation script without music. The line charts in both the Experimental and Control groups showed a visible trend of relaxation from the pre-sessions to the post-sessions, but it was not significant for a small number of subjects. Further research is recommended.

Clinical Observations of Subjects

Although statistical data showed no significant differences in anxiety and relaxation levels, 85% of the subjects in the Experimental group verbally stated that they felt more relaxed, after participating in the music-assisted relaxation sessions. As a notable example, Subject D stated that the numbness in her legs had decreased after the first session of music-assisted relaxation. Only 20% of the

Control group subjects noticed any significant difference when listening to the relaxation tape without music. Sixty-percent of them fell asleep ten minutes after the relaxation script started. Data came from notes collected by the researcher in discussions with subjects after each session.

CHAPTER V

SUMMARY

Discussion

As these analyses indicate, it is possible that the one-session training period was insufficient to allow the initial successful relaxation results to occur. Although subjects may have experienced relaxation during their first or second session, the absence of further improvement during the remaining sessions may have been disappointing and interpreted as failure. Several subjects indicated no difference in their anxiety and relax-mood levels on the survey sheets. Relaxation therapy studies suggest that subjects often find their first relaxation experience very successful, with ensuing sessions less successful in comparison. This explanation is made more likely in light of the implicit demands of a pre-post measurement which strongly suggest that change is expected, particularly positive change.

Although the results of this study do not support the predictions made earlier, they still bear some relevance to music-assisted relaxation therapy. The results suggest that levels of anxiety in brain injured subjects, as illustrated by the line charts (Appendix K) and verbal feedback from the subjects, might approach a level of statistical significance in a study involving a larger number of subjects.

Results of this study revealed that music-assisted relaxation therapy did not significantly reduce anxiety and increased levels of perceived relaxation on a

short six-session basis based on the traditional statistical analysis methods. Other studies have been conducted, using similar methods (Robb, 2000; Thaut & Davis, 1993; Kibler & Rider, 1983; Reynolds, 1984; Stoudenmire, 1975) where music-assisted relaxation therapy significantly reduced anxiety and increased levels of perceived relaxation. However, they were not conducted with brain injury subjects.

The basic questions of this study concerning the effect of music-assisted relaxation therapy to reduce levels of anxiety in the brain injured population remain unanswered. Identifying potential sources of this failure to produce significant reductions in anxiety levels may suggest strategies for improving the experimental procedures. Researchers also need to look at the source of anxiety and how aware the subjects were of their anxiety.

First, the nature of relaxation training itself may have served to undermine the purpose of the research study. Limited time factors did not permit the subjects to receive more than one session of relaxation training prior to the study. Cognitive deficits in the ability to comprehend, follow directions and concentrate on focusing their attention on the relaxation script may have prevented the subjects from responding favorably during the first two sessions. Often with brain injury subjects, learning skills are slowed down as a result of their injury (Code, Muller, Ben-Yishay & Laken, 1988; John, 1998; Kay, 1991; Maitz, 1994; Mandel, Sataloff & Schapiro, 1993; & Richardson, 1990). Relaxation training needed to be provided several weeks prior to the study to make certain that all

subjects understood the techniques of deep breathing, concentrating on the relaxation script and sitting/lying down correctly during the sessions. In observing the subjects in both groups, many failed to lay down on their backs, thus preventing full relaxation to take place in their bodies. One subject tended to move around often, instead of laying still, thus disrupting the relaxation and concentration process. Another subject insisted on lying on her stomach during the sessions, although the relaxation script specifically instructed the subject to lie on his/her back with both the hands and the feet uncrossed (Griswold, 1975 & Carlisle, 1999).

Second, both rehabilitation centers lacked settings that were conducive to the relaxation process. Ideally, the setting should have been in a room that was secluded from the regular living and rehabilitation rooms of each center. Acoustics were such in both centers that distractive noises were easily noticeable to the subjects. Prior to the last session of one of the Control Groups, an emergency situation that required police protection occurred, thus raising the anxiety levels of both subjects. In both centers, both patients and employees were visiting and moving around in the hallways and adjacent rooms, creating a distractive atmosphere for the subjects.

Third, many of the subjects tended to partake of tobacco and caffeine products prior to the relaxation sessions, thus nullifying the effects of the relaxation process. Future research studies need to require the subjects to refrain from the use of stimulants for at least two hours prior to each session.

Fourth, each subject's degree of anxiety varied over the six sessions, suggesting that it may stem from the severity of his brain injury, the length of time he has suffered from anxiety, pre-existing medical conditions prior to the brain injury, post-traumatic stress and other inter-related medical factors.

Fifth, attention deficit disorder may have interfered with the subjects' ability to concentrate on the music-assisted relaxation script simultaneously. Many brain injured subjects tend to feel overwhelmed, cognitively, when presented with too much stimuli.

Sixth, subjects may not have been taught about anxiety, how to recognize its symptoms, and how to treat it, prior to this research study, by their physicians, psychologists or other medical advisors. The researcher was not allowed to study each subject's medical diagnosis or medical history prior to or during the study.

Seven, attention deficit disorder may have interfered with the subjects' ability to concentrate on the relaxation scripts/music-assisted relaxation scripts for forty minutes.

Recommendations

Based on the results of this study, the author makes the following recommendations for clinical practice and future research projects:

1. Omit background music during the first part of the tape that contains the relaxation script to enhance the subjects' ability to concentrate on one stimulus at a time. Brain injury subjects commented that the music was too distractive

while listening to the music-assisted relaxation tape. Add the music to the tape at the end of the script.

2. Provide a room that is secluded from the distractions of brain injury rehabilitation center residential areas, kitchens, dining rooms, etc. The room must be "off limits" for those who are not participating in the study if it is located in a rehabilitation center.
3. Extend the length of the research study beyond six sessions. A minimum of ten and preference of twenty sessions would be more ideal in achieving positive results.
4. Where chairs are used in the room, they must support the subjects' backs and necks. Avoid low-back chairs. If subjects prefer to lay down on the floor, provide blankets and pillows.
5. Consider that live sessions with improvised music on the piano with the relaxation scripts, in contrast to tape-recorded music, may be more effective in achieving positive results, either individually or in small group sessions.
6. Require subjects to abstain from any form of stimulants (i.e. caffeine, sugar and tobacco products) at least two hours prior to each session.
7. Provide direct instruction for deep breathing techniques and music-assisted relaxation listening skills prior to the first session to promote focus of attention and to structure proper physical responses (i.e. breathing).
8. Re-design the Relax Mood Survey to include fewer and simpler words to describe more clearly how relaxed the subject is feeling.

9. Re-design the Personal Anxiety Report to include levels that go beneath the "calm, no anxiety" level (i.e. "deeply relaxed", "very deeply relaxed") that measure the degree of calmness and relaxation that the subject may feel after each session.
10. Reduce the length of each session from forty minutes to a maximum of thirty minutes as the forty-minute sessions tended to produce negative results in subjects who had attention deficit problems.
11. Future researchers should try to achieve a narrower group to study, using the qualitative research method. Consider recommendations on subject selection by the neurologist or neuro- psychologist of each subject who has diagnosed him with an anxiety disorder.
12. Use the Spielberger State-trait Anxiety Inventory for Adults (1983) to measure anxiety levels for pre- and post-sessions of future research studies.
13. Recommendations for future research include studies using advanced technology instruments (i.e. electromyography, electroencephalography), urinary cortisol and catecholamine levels and plasma prolactin or adrenaline/noradrenaline concentrations (Hanser, 1985), to measure levels of anxiety and relaxation more precisely in contrast to the past research methods of heart beat, pulse, galvanic skin response, etc. The use of recorded and improvised music to match brain wave patterns, as implemented by Andrew Weil (1998) may prove more effective than specific selections of music alone to reduce levels of anxiety in brain injury subjects. Using such instruments as

the electroencephalography can help determine which kind of music may enhance the relaxation response more effectively in brain injured subjects (Weil, 1998).

14. Consider conducting a music-assisted relaxation research study with other brain injury specialists (i.e. neurologists, neuro-psychologists, etc.) as part of the research team.

In conclusion, the central issue of this study concerning the effect of reducing anxiety levels in brain injury subjects through music-assisted relaxation therapy remains unresolved. The negative factors of only one session of relaxation training, a small number of subjects, a limited number of relaxation-assisted music sessions (6), numerous distractions in the research settings, and the tendency of various subjects to partake of stimulants (i.e. tobacco and caffeine products) prior to each session may have prevented any significant differences to be noted in the levels of anxiety and relaxation in this study. What would happen if a larger group of forty subjects were to participate over a period of six months or longer? Would statistical results show any significant difference between the Experimental group (music and relaxation) and the Control group (relaxation only) in the measurement of anxiety and relaxation measurements for the pre-sessions and post-sessions? Would the use of more advanced technological equipment (i.e. electroencephalography, electromyography, etc.) help to determine if music-assisted relaxation therapy can reduce anxiety levels in brain injured subjects? Such questions are significant and relate to the issue of finding

the most effective means of delivering music-assisted relaxation training to brain injured subjects who may benefit from them. As such, they are important issues and require further research in order to be resolved.

References

Amen, D.G. (1998). *Change your brain, change your life.* New York, NY: Random House.

Ballam, M. (1999). *More music and the mind (*audiocassette). Logan, UT: Phoenix Publications.

Bellamy, M.A. & Willard, P. (1993). Music therapy: an integral component of the oncology experience. *International Journal of Arts Medicine* 2(1), 14-19.

Brain Injury Association of Michigan (1999). *Brain injury: what is it?* (Pamphlet). Brighton, MI: BIA of MI.

Bruscia, K. (1989). The practical side of improvisational therapy. *Music Therapy Perspectives,* 6, 11-15.

Bush, C. (1995). *Healing imagery and music; pathways to the inner self.* Portland, OR: Rudra Press.

Byrnes, S.R. (1996). The effect of audio, video and paired audio-video stimuli on the experience of stress. *Journal of Music Therapy,* 33(4), 248-260.

Campbell, D.G. (1983). *Introduction to the musical brain.* St. Louis, MO: Magnamusic-Baton, Inc.

Carlisle, B.J. (1999). 1999 Survey of Neuro-Rehabilitation Centers in Michigan. Unpublished survey.

Claeys, M.S., Miller, A.C., Ben-Yishay, Y. & Laken, P. (1989). The role of music and music therapy in the rehabilitation of traumatically brain injured clients. *Music Therapy Perspectives,* 6, 71-77.

Clynes, M. (1982). *Music, mind and brain: the neuro-psychology of music.* New York, NY: Plenum Press.

Code, C, Muller, D., Ben-Yishay, Y. & Laken, P. (1988). *Brain damage, behavior, and cognitive development in clinical neuropsychology.*

Collier, R.B. (1976). *Pleneurethic and the brain.* Chicago, IL: Adams Press.

Collins, C.S. (1994). Musical awakenings. *New Age Journal,* May/June, 57-62.

Davis, W., Gfeller, K.E. & Thaut, M.H. (1992). *An introduction to music therapy--theory and practice,* Chapters 1 & 8. Dubuque, IA: Wm. C. Brown.

Davis, W., Gfeller, K.E. & Thaut, M.H. (1993). Music therapy in the treatment of mental disorders. *An introduction to music therapy theory and practice.* Dubuque, IA: Wm. C. Brown Publishers.

Davis, W.B. & Thaut, M.H. (1989). The influence of preferred relaxing music on measures of state anxiety, relaxation and physiological responses. *Journal of Music Therapy,* 26(4), 168-187.

Davison, P. (1998). *Adagio: music for healing* (audiocassette). Venice, CA: Davis Sounds BMI

Ellis, D.W. & Christensen, A.(1989). *Neuropsychological treatment after brain injury.* Norwell, MA: Kluwer Academic Publishers.

Eslinger, P.J. & Stouffer, J.W. (1994). Music therapy: a symphony for the soul. *TBI Challenge!* Spring, 12-14.

Faiver, R.T.S. (1988). Music therapy in the rehabilitation of traumatically brain-injured persons proposal for the application of and ecological model for therapeutic intervention. Unpublished thesis proposal. East Lansing, MI: Michigan State University Library.

Fordyce, D.J., Roueche, J.R. & Prigatano, G. (1983). Enhanced emotional reactions in chronic head trauma patients. *Journal of Neurology, Neurosurgery and Psychiatry,* 46, 620-624.

Goldberg, F.S., Hoss, T.M. & Chesna, T. (1988). Music and imagery as psychotherapy with a brain damaged patient: a case study. *Music Therapy Perspectives,* 5, 41-45.

Greenburg, R.P. & Fisher, S. (1972). Some different effects of music on projective and structured psychological tests. *Psychological Reports, 28,* 817-829.

Griswold, R.E. (1975) & Carlisle, B.J. (1999).*Slim through sleep; progressive relaxation manuscript, 31-37.* Bonita Springs, FLA: Effective Learning Systems, Inc.

Hammer, S.E. (1996). The effects of guided imagery through music on state and train anxiety. *Journal of Music Therapy,* 33(1), 47-70.

Hanser, S.B., Martin, P. & Bradstreet, K. (1982). *The effect of music on relaxation of dental patients.* Manuscript presented to the National Association for Music Therapy Annual Conference, Baltimore, Maryland, 1982.

Hanser, S.B., Larson, S.C. & O'Connell, A.S. (1983). The effect of music on relaxation of expectant mothers during labor. *Journal of Music Therapy, 20,* 50-58.

Hanser, S.B. (1985). Music therapy and stress reduction research. *Journal of Music Therapy,*
22(4), 193-206.

Ikeda, M. & Iwaki, T. (1996). The effects of repetitive exposure to music on subjective and physiological responses. *Journal of Music Therapy,* 33(3), 219-300.

Jacobson, E. (1962). *You must relax.* New York, NY: McGraw-Hill Book Company, Inc.

Janov, A. (1991). *The new primal scream,* Chapter 10. Chicago, IL:Dearborn Press.

Jellison, J.A., Madsen, C.K., R. Greer & C.H. Madsen (1975). The effect of music on autonomic stress response and verbal reports. *Research in music behavior: modifying music behavior in the classroom.* New York, NY: Teachers College Press.

Johnson, G. (1998). *Traumatic brain injury survival guide.* Traverse City, MI: Neuro-Recovery Head Injury Program.

Kay, T. (1991). *Minor head injury: an introduction for professionals.* Northville, MI: Simkins & Simkins.

Kay, T. (1993). Neuropsychological treatment of mild traumatic brain injury. *Journal of Head Trauma Rehabilitation,* 8(3), 74-85.

Keller, T.A. & Cowan, N. (1994). Developmental increase in the duration of memory for tone pitch. *Developmental psychology,* 30(6), 855-863.

Leviton, R. (1994). Healing vibrations. *Yoga Journal,* Jan/Feb.

Lucia, C.M. (1987). Toward developing a model of music therapy intervention in the rehabilitation of head trauma patients. *Music Therapy Perspectives,* 4, 34-39.

McCarthy, W.G. (1985). Promoting language development through music. *Communication,* November, 237-242.

Madsen, C.K. (1997). Emotional response to music as measured by the two-dimensional CRDI. *Journal of Music Therapy,* 34(3), 187-199.

Magee, W. (1999). Music therapy within brain injury rehabilitation: to what extent is our clinical practice influenced by the search for outcomes? *Music Therapy Perspectives,* 17, 20-26.

Maitz (1994). *TBI Challenge!,* 2(2), 18-25.

Mandel, S.T., Sataloff, R.T. & Schapiro, S.R. (1993). *Minor head trauma-assessment, management and rehabilitation,* New York, NY: Berkley Books.

Miles, E. (1997). *Tune your brain,* New York, NY: Berkley Books.

O'Callaghan, C. (1999). Recent findings about neural correlates of music pertinent to music therapy across the life span. *Music Therapy Perspectives,* 17(1), 32-36.

Richardson, J.T.E. (1990). *Clinical and neuropsychological aspects of closed head injury.* Bristol, PA: Taylor & Francis, Inc.

Rimel, R.W., Giordani, B., Barth, J.T., Boll, T.J. & Jane, J.A. (1981). Disability caused by minor head injury. *Neurosurgery,* 9, 221-228.

Robb, S.L., Nichols, R.J., Rutan, R.L., Bishop, B.L. & Parker, J.C. (1995). The effects of music assisted relaxation on preoperative anxiety. *Journal of Music Therapy,* 32(1), 2-21.

Robb, S.L. (2000). Music assisted progressive muscle relaxation, progressive muscle relaxation, music listening, and silence: a comparison of relaxation techniques. *Journal of Music Therapy,* 37(1), 2-21.

Rohner & Miller (1980). Degrees of familiar and affective music and their effects on state anxiety. *Journal of Music Therapy,* 17(1), 2-14.

Saperston, B.M. (1989). Music-based individualized relaxation training (MBIRT): a stress-reduction approach for the behaviorally disturbed mentally retarded. *Music Therapy Perspectives,* 6, 26-32.

Saric & McLeod (1993). *Biology of anxiety disorders.* Washington, D.C.: American Psychiatric Press.

Scartelli, J.P. (1982). The effect of sedative music on electro-myographic biofeedback assisted relaxation training of spastic cerebral palsied adults. *Journal of Music Therapy,* 19(4), 210-218.

Smith, C.A. & Morris, L.W. (1976). Effects of stimulative and sedative music on cognitive and emotional components of anxiety. *Psychological Reports,* 38, 1187-1193.

Spielberger, C.D., Gorsuch, R.L., Luschene, R., Vagg, P.R. & Jacobs, G.A. (1983). *Manual for state-trait anxiety inventory for adults.* Palo Alto, CA: Mind Garden, Inc.

Spintge, R. & Droh, R. (Ed) (1992). *Music Medicine,* Chapters 6 & 8. St. Louis, MO: MMB Music.

Staum, M.J. & Brotons, M. (2000). The effect of music amplitude on the relaxation response. *Journal of Music Therapy,* 37(1), 22-39.

Strauser, J.M. (1997). The effects of music versus silence on measures of state anxiety, perceived relaxation, and physiological responses of patients receiving chiropractic interventions. *Journal of Music Therapy,* 34(2), 88-105.

Thaut, M.H. & Davis, W.B. (1993). The influence of subject-selected versus experimenter-chosen music on affect, anxiety and relaxation. *Journal of Music Therapy,* 30(4), 210-223.

Tupper, D.F. & Cicerone, K.D. (1991). *The neuropsychology of everyday life: issues in development and rehabilitation.* Norwell, MASS: Kluwer Academic Publishers.

Unkefer, R.F. (Ed) (1990). *Music therapy in the treatment of adults with mental disorders: theoretical bases and clinical interventions.* New York, NY: Schirmer Books.

Weil, A. (1998). *Sound body, sound mind: music for healing* (audiocassette). New York, NY: Upaya Recording Company.

Wood, R.L. & Eames, P. (Ed) (1989). *Models of brain injury rehabilitation,* Baltimore, MD: John Hopkins University Press.

APPENDICES

Appendix A

1999 SURVEY of NEURO-REHABILITATION CENTERS IN MICHIGAN

NAME OF NEURO-REHABILITATION CENTER	MUSIC THERAPY PROGRAMS?
Ann Arbor Rehabilitation Centers, Inc. Ann Arbor, Michigan	No
Battle Creek Neuro-Rehabilitation Center Battle Creek, Michigan	No
Beaumont Rehabilitation & Health Center Birmingham, Michigan	No
Broe Rehabilitation Services Farmington Hills, Michigan	No
Chelsea Rehabilitation Center Chelsea, Michigan	No
Coach House Rehabilitation Center Coldwater, Michigan	No
Comprehensive Professional Services, Inc. North Muskegon, Michigan	No
DMC Children's Hospital of Michigan Novi, Michigan	No
Eisenhower Center Ann Arbor, Michigan	No
Functional Recovery Inc. Flint, Michigan	No
Greenery Health Care Center Clarkston, Michigan	No
Health Partners, Inc. Southfield, Michigan	No
Heartland Healthcare Centers of West Michigan	No (x 24)

NAME OF NEURO-REHABILITATION CENTER	MUSIC THERAPY PROGRAM?
East Lansing, Michigan	To MSU Music Therapy Clinic
Hope Network Rehabilitation Center Grand Rapids, Michigan	No
Irvine Neuro-Rehabilitation Center Oak Park, Michigan	No
J.A. Ditty & Associates Inc. Neuro-Educational Center Troy, Michigan	No
The Lighthouse Rehabilitation Center Caro, Michigan	Yes
McLaren Regional Rehabilitation Center Flint, Michigan	No
Mary Freebed Outpatient Therapy Center Grand Rapids, Michigan	No
Medical Rehabilitation U of M Medical Center Ann Arbor, Michigan	No
Neurological Recovery Systems Royal Oak, Michigan	No
New Beginnings Rehabilitation Services Cadillac, Michigan	No
New Start, Inc. West Bloomfield, Michigan	No
Olsten Health Services Lansing, Michigan	No
Origami Rehabilitation Services Mason, Michigan	No-Refers patients to MSU Music Therapy

NAME OF NEURO-REHABILITATION CENTER	MUSIC THERAPY PROGRAMS?
PAR Rehabilitation Services East Lansing, Michigan	No
Peckham Vocational Industries East Lansing, Michigan	No
Rainbow Rehabilitation Centers Ypsilanti, Michigan	No
Rehabilitation Centers of Michigan, Inc.	
Flint, Michigan	No
Grosse Pointe, Michigan	No
Southfield, Michigan	No
Rehabilitation Medicine Clinic Michigan State University East Lansing, Michigan	No-Refers patients to MSU Music Therapy Clinic
Rehabilitation Systems of Michigan, Inc. Flushing, Michigan	No
St. Joseph Mercy Health System Ann Arbor, Michigan	No
St. Luke's Rehabilitation Care Saginaw, Michigan	No
Special Tree Rehabilitation System Romulus, Michigan	No
Specialized Residential Care Ferndale, Michigan	No-Networks with other therapy programs.
Upper Michigan Rehabilitation Center Marquette, Michigan	No

No

NAME OF NEURO-REHABILITATION CENTER	MUSIC THERAPY PROGRAMS?
Willowbrook Rehabilitation Center Brighton, Michigan	No
Worth Rehabilitation Center Kentwood, Michigan	No

TOTAL = 64 Neuro-Rehabilitation Centers
No Music Therapy Programs = 60
Music Therapy Programs = 1
Affiliations with Music Therapy Clinics = 4

Appendix B

RELAXATION THERAPY SCRIPT

Hello. My name is Barbara Carlisle. Our relaxation therapy program can help you to achieve your goals of reduced anxiety and increased relaxation. Many people have reduced their anxiety and tension levels through this approach. Relaxation therapy can motivate and assist you to achieve a sound, healthy, calm, serene, physical and mental attitude. All right now. We are ready to employ the relaxation therapy technique.

I want you to sit comfortably in a chair; or if you prefer, lie down and relax your body as much as you consciously can. Uncross your hands. Uncross your feet. I will now show you how to reach a level of physical and mental relaxation deeper than you have ever achieved. Just relax. Focus on your breath. Slowly take a deep breath through your nose, as deep as you can. When you're comfortably full of air, hold the breath for just a few seconds. Then slowly exhale through your mouth all the air to escape in a gentle, steady stream. When you're empty of air, breathe in slowly and deeply once again, enjoying your very own tempo and rhythm of breathing. Slowly exhale through your mouth; and when you come to the end, try squeezing a little more air out. Squeeze a little more...and a little more. Now take in a deep breath all the way from your lower abdomen, slowly filling yourself with clean, refreshing air. Slowly exhale through your mouth, blowing away all the tension and anxiety that has built up inside of you. Now you are taking slow, deep, even breaths, feeling more and more relaxed, each time you breathe in and out, allowing yourself to let go and relax.

I want you to focus your attention on your left foot and ankle. Become aware of

them together and at the same time. Without any conscious effort at all, your left foot and ankle are beginning to let go and relax. Let your attention move up your left leg from your left ankle all the way up to the left knee. Become aware of the left calf and knee at the same time. Notice the feeling in that part of your body. Become aware of the skin, the flesh and the muscle in your lower left leg. Without any effort at all, your left knee and calf are beginning to relax, gradually and steadily. Your left ankle and foot relax even more with each smooth and easy breath that you exhale. Now let your thoughts move easily up your leg from your left leg all the way up to your left hip. Should your mind drift off to other things, guide your thoughts easily and gently back to what you are now doing. There is plenty of time later for other thoughts. Now focus your left thigh and hip together and at the same time. Very easily and gradually, your left hip and thigh begin to relax. Left knee and calf relax. Left ankle and foot relax even more with each smooth, easy breath that you exhale. Focus your attention on your right foot and ankle. Become aware of the feeling in the toes of your right foot, the ball of the foot, the arch, the heel, and the top of the right foot and the right ankle. Become aware of the muscles, as well as the bones of the right foot and ankle; but do this gradually and steadily. Your entire right foot and ankle are beginning to relax. Left knee and calf relax more. Left ankle and foot relax even more with each smooth, easy breath that you exhale.

Move your attention over the lower right leg and let your thoughts move up from the ankle to the knee. Become aware of your right calf and knee at the same time. Notice the heaviness in that part of your body. Become aware of the muscles and bones without trying to do anything consciously. Very gradually and very steadily your right knee and

calf begin to relax. Right ankle and foot relax more. Left hip and thigh relax more. Left knee and calf relax more. Both ankles and feet relax even more with each smooth, easy breath that you exhale.

Now let your thoughts move gently up your right leg from the knee all the way up to the right hip. Become aware of the loose feeling of heaviness in your right thigh and hip. Notice those strong, powerful muscles, the largest muscles in your body. Very easily and gradually, your right hip and thigh are relaxing. Right knee and calf relax more. Left knee and calf relax more. Both ankles and feet relax even more with each smooth, easy breath that you exhale. Now both legs and hips are starting to relax deeply. Think of the word RELAX. Cause the feet, legs and hips to relax even more as you think of the word RELAX.

Now focus your attention on both hands. Without making any conscious effort, gradually let both hands relax. Hips relax more. Both thighs relax more. Both knees and calves relax more. Both ankles and feet relax even more with each smooth and easy breath that you exhale. Let your thoughts move up your arms from your hands all the way up your lower arms to your elbows. Become aware of the weight and feelings in both elbows and lower arms. Be aware of the skin, the flesh, the muscles and bones in your elbows and lower arms. Without any conscious effort both elbows and lower arms are beginning to let go and relax.

Now let your thoughts move up your arms from the elbows to the shoulders. Both shoulders are beginning to relax. Focus your attention on your neck and jaws. Relax your jaws slightly so that your teeth are barely touching. Become aware of the many

feelings in your neck, the back of the neck, the sides of your neck and the throat. Pay particular attention to your vocal chords. Without any effort at all, your neck relaxes more deeply. Shoulders relax more. Arms and hands relax more. Both hips, legs and feet relax even more with each smooth, easy breath that you exhale. And now, think of the word RELAX. Cause your hands, your arms and your shoulders to relax more deeply.

Now let your thoughts move downward from the chest to the abdominal regions. Become aware of the entire area around your abdomen. Notice as you are breathing slowly and deeply from the diaphragm how that area begins to slightly expand and contract. Become aware of the muscles in the outer regions of your abdomen. Focus your attention inward now, and become aware of the many organs deep within your abdomen. All are beginning to relax and function more harmoniously. Now the entire abdomen begins to relax more deeply. Chest relaxes more deeply. Neck and shoulders relax more. Arms and hands relax more. Hips, legs and feet relax even more with each smooth, easy breath that you exhale. And now think RELAX. Cause your abdomen, chest and stomach to relax deeply.

Move your attention to your back. Become aware of the weight of your upper back against the surface on which you are now resting. Become aware of your lower back. You know there are many, many muscles connecting each vertebrae of the spine. Become aware of the spine--your spine, feeling the flexibility of the spine from the tail bone to the base of your skull. Become aware of those strong, powerful muscles throughout your back. And now, as if automatically, without any effort at all, your entire back begins to let go and relax, gradually and steadily. Abdomen and chest relax more.

Neck and shoulders relax more. Hips, legs and feet relax even more with each smooth, easy breath that you exhale. Think RELAX. Cause your back to relax more.

Now focus your attention on your forehead, eyes and eyelids. Become aware of the small muscles in your forehead, eyelids and the area above the eyes. Do not try to make anything happen. Gradually feel the tension in your face and head begin to leave. Your forehead is becoming very smooth and very calm. The muscles in the eyelids and above the eyes are beginning to relax and let go. Now a wonderful wave of relaxation begins flowing all around your face, the sides of your head, across the tip of your head, and down the back of your head to your neck. The relaxation flows down your face from your eyelids to your cheeks, lips, tongue and jaws. And now think RELAX. Your neck and shoulders relax more. Your chest and abdomen relax more. Hips, lower back and upper back relax more. Arms and hands, legs and feet relax even more with each smooth, easy breath that you exhale. Now you are DEEPLY RELAXED.....VERY DEEPLY RELAXED. Your mind is clear, very clear and very calm. You feel good---very good. You feel very peaceful and very calm. You are feeling at peace with yourself, at peace with the world and at peace with your family. You are developing more calmness in everything that you do. Think now of the words RELAX....RELAX....RELAX. This is a signal to your subconscious that brings about a deeply relaxed, receptive level. Every time

you practice relaxation imagery, you will feel yourself relaxing more deeply and faster each day. Through relaxation therapy you are now able to enter in to the deeper levels of your mind. When you are in these deep inner levels of relaxation, physically and

mentally, you are open to every positive affirmation that will bring you success in your relaxation therapy program. You will find yourself becoming more calm and serene in everything you do.

(CONTROL GROUP): Enjoy now the quiet, peaceful silence. Let your thoughts and feelings flow smoothly into tranquility. Your nerves and muscles are experiencing deep relaxation. Take the next 10-15 minutes to experience this relaxed state.

(EXPERIMENTAL GROUP): Listen now to the quiet, peaceful, soothing music in the background. Let your thoughts and feelings flow smoothly into tranquility. Your nerves and muscles are experiencing deep relaxation and flowing smoothly with the music. Your emotions are becoming calm and serene. Take the next 10-15 minutes to listen to the calm, peaceful music in the background.

(Recorded music from "Adagio" (Davison , 1998) will be played for the next 10-15 minutes for the Experimental group session. The Control group will be given 10-15 minutes of silence. At the end of each relaxation therapy session, the therapist will instruct the participants to awake at the count of five.)

Awaken gradually, now, as I count to five. One--your attention is gradually returning to your surroundings. Two--you are aware of the sounds around you. Three--you are feeling refreshed, relaxed and stress-free. Four--you are aware of the other people in the room with you. Five--you are totally awake and ready to go forth to face the challenges of this day with ease .

(Griswold, 1975 & Carlisle, 1999)

Appendix C1

Michigan State University
School of Music
East Lansing, Michigan 48824-1043
(517) 353-5340

September 25, 2000

Dear Study Participant:

We are writing to ask your permission to participate in our research study. The objective of this study is to measure anxiety reduction through relaxation therapy and music therapy in brain injury survivors. The procedure will involve a verbally guided relaxation therapy process, either with music or without music. Participants will mark their levels of anxiety on a rating form and will answer questions intended to measure each participant's level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedure will involve no risks to the participants. Participants are free to withdraw from the study any time without penalty and can refuse to answer any questions or refuse to participate in any procedures.

This study has already been explained to your medical authorities, and we are contacting you with their permission. We have visited them and explained our study. Participation is entirely voluntary. Your privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with parents, spouses, therapists, physicians or psychologists.

If you have any questions about participants' rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2180. We hope you will participate; and you can indicate this by signing and returning the enclosed consent form. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

Sincerely yours,

Roger Smeltekop, MT-BC
Professor of Music

Barbara J. Carlisle, MT
Masters Candidate

PARTICIPANT's CONSENT FORM

You are requested to participate in a study of anxiety reduction through either music and relaxation therapy or through relaxation therapy without music. The procedure will involve a verbally guided relaxation therapy process, either with music or without music. You will be asked to mark your levels of anxiety on a rating form and will answer questions intended to measure your level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur weekly over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed.

The research procedures will involve no risks to the participants.

You are free to withdraw from the study any time without penalty. You can refuse to answer any questions or refuse to participate in any procedures. Your privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with parents, spouses, therapists, physicians or psychologists. Individual names will not be used in any report of results. Within these restrictions, when the study is completed, the overall results will be made available upon your written request.

If you have any questions about participants' rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2180. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517)355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

I voluntarily agree to participate in this study.

Signed:_____

Date:_____

(Participant)

Signed:_____

Date:_____

(Guardian/Parent, if participant is under age 18)

Appendix C2

Michigan State University
School of Music
East Lansing, Michigan 48824-1043
(517) 353-5340

September 25, 2000

Dear Spouse:

We are writing to ask your permission for your spouse to participate in our research study. The objective of this study is to measure anxiety reduction through relaxation therapy and music therapy in brain injury survivors. The procedure will involve a verbally guided relaxation therapy process, either with music or without music. Participants will mark their levels of anxiety on a rating form and will answer questions intended to measure each participant's level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedure will involve no risks to the participants. Participants are free to withdraw from the study any time without penalty and can refuse any questions or refuse to participate in any procedures.

This study has already been explained to your medical authorities, and we are contacting you with their permission. We have visited them and explained our study. Participation is entirely voluntary. Your spouse's privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists.

If you have any questions about your spouse's rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2180. We hope your spouse will participate; and you can indicate this by signing and returning the enclosed consent form. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

Sincerely yours,

Roger Smeltekop, MT-BC
Professor of Music

Barbara J. Carlisle, MT
Masters Candidate

SPOUSE's CONSENT FORM

Your spouse has been requested to participate in a study of anxiety reduction through either music and relaxation therapy or through relaxation therapy without music. The procedure will involve a verbally guided relaxation therapy process either with music or without music. Your spouse will be asked to mark his/her levels of anxiety on a rating form and will answer questions intended to measure his/her level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur weekly over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedures will involve no risks to the participants.

Your spouse is free to withdraw from the study any time without penalty. He/she can refuse any questions or refuse to participate in any procedures. His/her privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists. Individual names will not be used in any report of results. Your verbal consent will be obtained as a precondition of your spouse's participation in this study. Individual names will not be used in any report of results. Within these restrictions, when the study is completed, the overall results of it will be made available to you upon your written request.

If you have any questions about your spouse's rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2810. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

I voluntarily agree for my spouse to participate in this study.

Signed: _____ Date:

_____

(Spouse)

Spouse's Name:

_____

Appendix C3

Michigan State University
School of Music
East Lansing, Michigan 48824-1043
(517) 353-5340

September 25, 2000

Dear Guardian:

We are writing to ask your permission for your relative to participate in our research study. The objective of this study is to measure anxiety reduction through relaxation therapy and music therapy in brain injury survivors. The procedure will involve a verbally guided relaxation therapy process, either with music or without music. Participants will mark their levels of anxiety on a rating form and will answer questions intended to measure each participant's level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of closed head injury. The entire procedure will take place in six forty-minute sessions that will occur over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedure will involve no risks to the participants. Participants are free to withdraw from the study any time without penalty and can refuse any questions or refuse to participate in any procedures.

This study has already been explained to your medical authorities, and we are contacting you with their permission. We have visited them and explained our study. Participation is entirely voluntary. Your relative's privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists.

If you have any questions about participants' rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research at (517) 355-2180. We hope your son/daughter will participate; and you can indicate this by signing and returning the enclosed consent form. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818.

Sincerely yours,

Roger Smeltekop, MT-BC
Professor of Music

Barbara J. Carlisle, MT
Masters Candidate

GUARDIAN's CONSENT FORM

Your relative has been requested to participate in a study of anxiety reduction through either music and relaxation therapy or through relaxation therapy without music. The procedure will involve a verbally guided relaxation therapy process either with music or without music. Your relative will be asked to mark his/her levels of anxiety on a rating form and will answer questions intended to measure his/her level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedure will involve no risks to the participants.

Your relative is free to withdraw from the study any time without penalty. He/she can refuse any questions or refuse to participate in any procedures. His/her privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists. Individual names will not be used in any report of results. Your verbal consent will be obtained as a precondition of your relative's participation in this study. Individual names will not be used in any report of results. Within these restrictions, when the study is completed, the overall results of it will be made available to your upon your written request.

If you have any questions about your relative's rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2180. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

I voluntarily agree for my son/daughter to participate in this study.

Signed: _____ Date:
_____ (Parent or Legal Guardian)

Son's/Daughter's Name:

_____

Appendix C4

Michigan State University
School of Music
East Lansing, Michigan 48824-1043
(517) 353-5340

September 25, 2000

Dear Medical Authority:

We are writing to ask your referral of your patients who are able to participate and are appropriate for our research study. The objective of this study is to measure anxiety reduction through relaxation therapy and music therapy in brain injury survivors. The procedure will involve a verbally guided relaxation therapy process, either with music or without music. Participants will mark their levels of anxiety on a rating form and will answer questions intended to measure each participant's level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur weekly over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedures will involve no risks to the participants. Participants are free to withdraw from the study any time without penalty and can refuse to answer any questions or refuse to participate in any procedures.

This study will be explained to your patient after we have received your permission for them to participate in our research study. Participation is entirely voluntary. Your patients' privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists. Your verbal consent will be obtained as a precondition of your patient's participation in this study. Individual names will not be used in any report of results. Within these restrictions, when the study is completed, the overall results of it will be made available to you upon your written request.

If you have any questions about participants' rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research at (517) 355-2180. We hope your patient will participate; and you can indicate this by signing and returning the enclosed consent form. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 or Barbara J. Carlisle at (517) 332-3818 (home).

Sincerely yours

Roger Smeltekop, MT-BC Barbara J. Carlisle, MT

Professor of Music Masters Candidate

MEDICAL AUTHORITY'S CONSENT FORM

Your patient has been requested to participate in a study of anxiety reduction through either music and relaxation therapy or through relaxation therapy without music. The procedure will involve a verbally guided relaxation therapy process either with music or without music. Your patient will be asked to mark his/her levels of anxiety on a rating form and will answer questions intended to measure his/her level of anxiety reduction. All responses will remain confidential. Levels of anxiety reduction will be compared according to participant's age, gender and area of brain injury. The entire procedure will take place in six forty-minute sessions that will occur weekly over a period of six weeks. The study will be conducted in a central location convenient to the participants. Benefits that may come from participation in this study cannot be guaranteed. The research procedures will involve no risks to the participants.

Your patient is free to withdraw from the study any time without penalty. He/she can refuse any questions or refuse to participate in any procedures. His privacy will be protected to the maximum extent allowable by law. No information regarding individual participants will be shared with guardians, spouses, therapists, physicians or psychologists. Your verbal consent will be obtained as a precondition of your patient's participation in this study. Individual names will not be used in any report of results. Within these restrictions, when the study is completed, the overall results of it will be made available to you upon your written request.

Your participation will include releasing or supplying names of possible patients who are able to participate and are appropriate candidates for this research study. Your participation is totally voluntary. Your patient's name will be protected. If you have any questions about your patient's rights, please telephone Dr. David Wright, Chairperson of the Human Subjects University Committee on Research, at (517) 355-2180. If you have any questions or concerns about this study, please telephone Professor Roger Smeltekop at (517) 355-6753 (work) or Barbara J. Carlisle at (517) 332-3818 (home).

I voluntarily agree for my patient to participate in this study.

Signed: _____
Date: _____
(Medical Authority)

Patient's Name:
_____

Appendix D

Michigan State University
School of Music
Music Therapy Clinic
East Lansing, Michigan 48824-1043

September 5, 2000

Dr. Robert J. Fabiano, Executive Director
PAR Rehabilitation Services
780 W. Lake Lansing Road
East Lansing, Michigan 48823

Dear Dr. Fabiano:

I am a graduate student in the Music Therapy Department of Michigan State University. I have earned my Bachelor's Degree in Music Therapy in 1975; and I have been a Registered Music Therapist for over twenty five years in the Midwestern states, working with a variety of patients in hospitals, special education schools, rehabilitation centers and privately. My present interest is in working with brain injury patients, both privately and in rehabilitation centers. I have recently served as a chapter president and member of both the Board of Directors and Survivor's Committees for the Brain Injury Association of Michigan.

I am writing in behalf of myself and Professor Roger Smeltekop of the Music Therapy Department to ask your permission to conduct a research study on the measurement of anxiety reduction among brain injury patients in the rehabilitation centers of Ingham County. The title of our research study is "The Effects of Music and Relaxation Therapy on Anxiety Levels in Brain Injury Patients".

We have designed this study to compare the levels of anxiety reduction in brain injury patients, using two different variables. One variable, relaxation therapy, has been used in a variety of medical settings to assist patients in reducing anxiety levels. The other variable, music and relaxation therapy, has slowly been emerging into hospitals, rehabilitation centers and music therapy centers, as medical teams have discovered that music and relaxation therapy can be more effective in reducing anxiety levels in their patients. Neither type of therapy has been documented extensively with brain injury patients, however.

In our research study we would like to compare the effectiveness of anxiety reduction, using both the relaxation therapy (alone) and the music and relaxation therapy in a sample of twenty male and female brain injury patients, ranging in age from 18 to 55. We would like to invite twenty people from your rehabilitation center: ten males and ten females to participate in this research study. Two other rehabilitation centers will also be contacted in Ingham County and invited to participate.

The experimental and control groups will differ mainly in the factors of music and relaxation therapy for the experimental group versus relaxation therapy only for the control group. Each group will consist of ten brain injury patients (5 males and 5 females), ranging in age from 18 to 55. A questionnaire will be used, prior to and following the study, to determine any significant changes in the anxiety levels of each group. Each group will meet one to two days a week for six forty-minute sessions. A relaxation tape from the Effective Learning Systems Board of Directors will be used in both groups; and in the experimental group an additional cassette tape of music (Adagio" by Davidson, 1998) will be played throughout each session in the background.

We would like to begin on approximately September 18, 2000, if you grant permission to conduct this study, and if this schedule is acceptable to you and to the members of your professional team.

Subjects will respond anonymously. During the data collection period, prior to and following the study, we will use individual identification numbers to protect the privacy of each subject.

If you and the professional team members approve our request to conduct this study, we will explain our study to the patients and pass out a letter of explanation and an informed consent form to the patients to take home to their spouses/guardians.

As principal investigator, I will be happy to visit your office and explain our request in greater detail if that would be helpful. If you have any questions about my qualifications, please feel free to contact Professor Roger Smeltekop, (Clinical Director of the MSU Music Therapy Clinic) at (517) 353-6426 or Dr. Frederick C. Tims (Director of the MSU Music Therapy Department) at (517) 432-2613. If you would like further information about my research study, you may contact me at (517) 332-3818 or by e-mail at carlisl6@juno.com.

Sincerely yours,

Barbara J. Carlisle, MT
Masters Candidate
Michigan State University

Appendix E1

Music Therapy Survey for Brain Injury Patients

Barbara J. Carlisle, Michigan State University

Demographic Information: This will allow us to describe our sample of responding brain injury patients in general terms. All personally identifiable information will be held strictly confidential.

1. Your age: _____

2. Your sex: (please circle) Male Female

3. Type of brain injury: (please circle)

   Traumatic Brain Injury Closed Head Injury

4. Cause of brain injury: (please circle one)

   Auto Accident Bicycle Accident Physical Fall Bullet Wound Stroke

   Aneurysm Tumor Encephalitis Other _____(specify)

Other Conditions that Warrant Special Accommodation: (Please specify what special accommodation would be necessary).

5. Medications ___Yes ___No _____

6. Seizure Precautions ___Yes ___No _____

7. Sensory Impairments ___Yes ___No _____

8. Behavior Disorders ___Yes ___No _____

9. Physical Appliances ___Yes ___No _____

10. Wheelchair ___Yes ___No _____

11. Hearing Aids ___Yes ___No _____

12. Braces (Leg/Physical) ___Yes ___No _____

12. Braces (Leg/Physical) ___Yes ___No _____

13. Prosthesis ___Yes ___No_____

14. Walker ___Yes ___No_____

Music Background:

15. What is your favorite type of music? (Please circle one)

Religious Classical Easy Listening

Popular Country Western Jazz

16. How important is music in your daily life? (Please circle one: 1=least important; 5=most important).

1 2 3 4 5

17. What kinds of music activities do you participate in and how often do you participate in them? (Please check all that apply)

Music Activity	Daily	Weekly	Monthly
Community Choir	_____	_____	_____
Church Choir	_____	_____	_____
Informal Music Groups	_____	_____	_____
Writing Music	_____	_____	_____
Other (Specify)_____	_____	_____	_____

18. How many hours per week do you spend listening to music? (Please indicate number of hours)

CD's/Cassette Tapes _____

Concerts _____

Radio Music _____

19. Is there any type of music you may have an adverse reaction to? If so, please specify. (i.e. styles of music, specific instruments, high or loud pitches)

20. Please check which community classes you have taken related to relaxation therapy or stress reduction:

____Yoga ____Meditation ____Progressive Relaxation

Schedules

21. What is your best day to schedule music therapy sessions? (Please circle one)

Monday Tuesday Wednesday Thursday Friday

22. What is your best time to schedule music therapy sessions? (Please circle one)

Morning Afternoon Evening

Appendix E2

Code Sheet For Music Therapy Survey

SPSS Variable Name:	Coding Instructions & Description of Variable:
RESPID	Respondent's ID Number: Right justify (indicated by RJ hereafter) and use sequential numbers.
AGE	Code using literal reproducing
SEX	Code with 1=Male; 0=Female
GROUP	Code with 1=Experimental Group; 0=Control Group
BI	Respondent's type of Brain Injury. Code with 1=Traumatic brain injury; 0=Closed brain injury
CAUSE	Cause of respondent's brain injury. Code with: 1=auto accident, 2=bicycle accident, 3=physical fall, 4=bullet wound, 5=stroke, 6=aneurysm, 7=tumor, 8=encephalitis, 9=other.
CONDITIONS	Other medical conditions that may warrant special accommodations. Code with 1=yes, 0=no for columns mc1=mc10.
	mc1=medications; mc2=seizure precautions; mc3=sensory impairments; mc4=behavior disorders; mc5=physical appliances; mc6=wheelchair; mc7=hearing aids;
mc8=braces	(leg/physical); mc9=prosthesis; mc10=walker.
FAVMUSIC	Respondent's favorite type of music. Code with: 1=yes; 0=no for relig, classic, easylis, pop, west & jazz.
MUSACT	Number of hours per week respondent listens to music. Code with: comcho=community choir; chucho=church choir; img=informal music groups; wm=writing music; other=other (specify).
MUSHRS	Number of hours per week respondent listens to music.

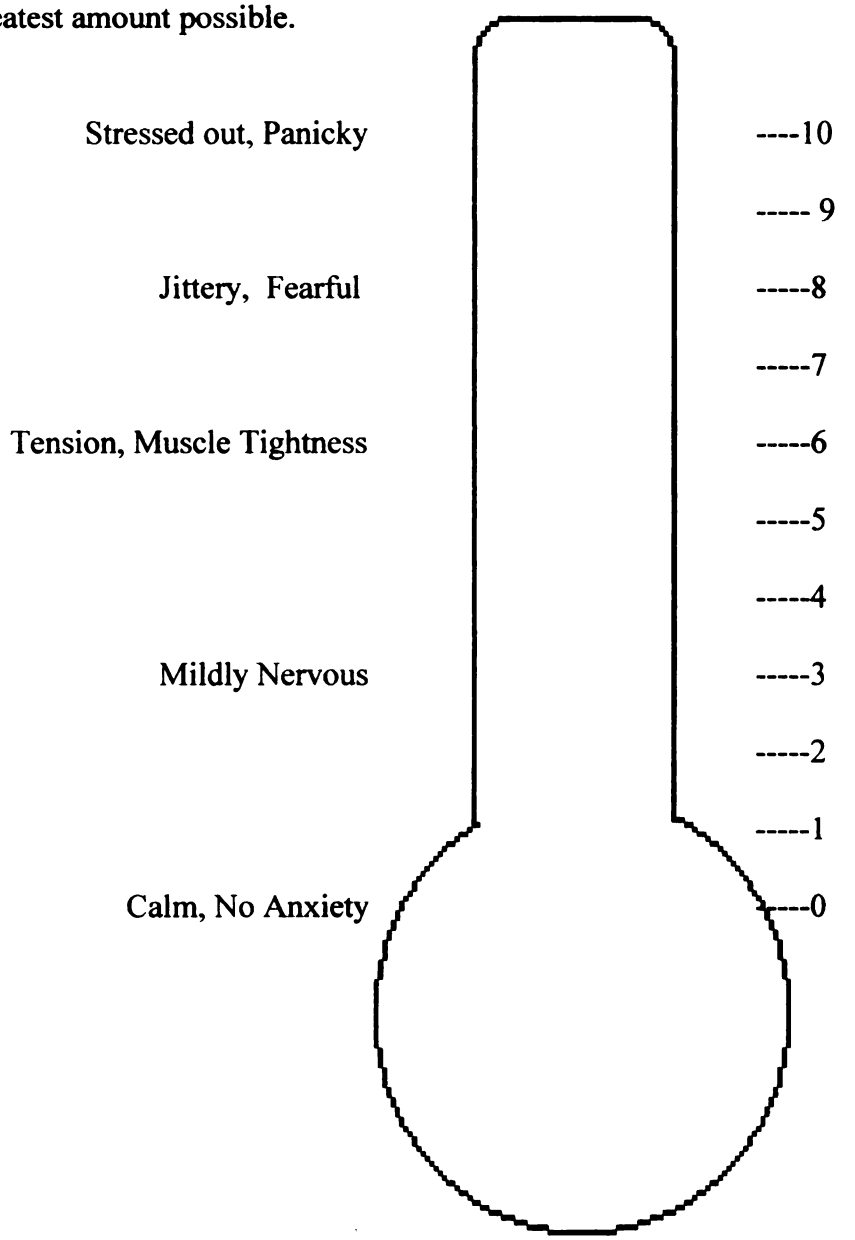
	Code with: cdl=CD, con2=concerts, and radio=radio music. 1=yes; 0=no.
REACTION	Adverse reaction respondent may have to certain types of music. Code with 1=yes; 0=no. Also, use literal reproducing.
RELAX	Community classes or individual training respondent may have received in yoga, meditation or progressive relaxation. Code with Yoga=yoga; medit=meditation; relax=relaxation.

Appendix F2

NAME: _____ DATE: _____

PERSONAL ANXIETY REPORT

How much anxiety do you feel now **before** the session? Use the scale below to show it. The scale works like a thermometer. Use a pen or pencil to draw in the "mercury" and show how much anxiety you feel. Drawing a line at 0 means no anxiety at all. Drawing a line at 5 means a moderate amount. And drawing a line at 10 means the greatest amount possible.

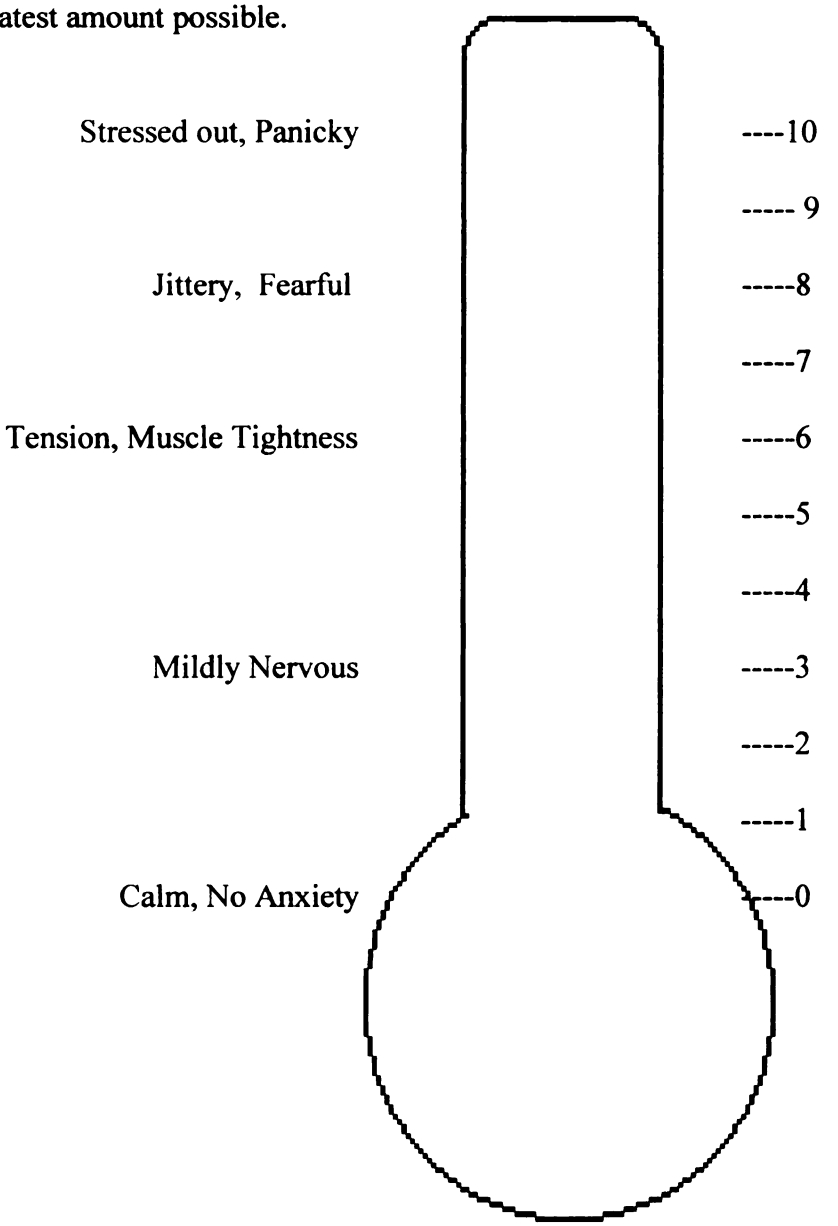


Appendix F2

NAME: _____ DATE: _____

PERSONAL ANXIETY REPORT

How much anxiety do you feel now **after** the session? Use the scale below to show it. The scale works like a thermometer. Use a pen or pencil to draw in the "mercury" and show how much anxiety you feel. Drawing a line at 0 means no anxiety at all. Drawing a line at 5 means a moderate amount. And drawing a line at 10 means the greatest amount possible.



Appendix G1

THE RELAX MOOD SURVEY

NAME _____ DATE _____

Before Relaxation Session

(1-10)

I feel:

Calm _____

Loose _____

Breathing easily _____

Quiet _____

Unwound _____

Tranquil _____

Soft _____

Composed _____

Mellow _____

Serene _____

DIRECTIONS: Indicate how you were feeling before participating in the relaxation session. 1=least and 10=highest level of each feeling.

Appendix G1

THE RELAX MOOD SURVEY

NAME _____ DATE _____

After Relaxation Session

(1-10)

I feel:

Calm _____

Loose _____

Breathing easily _____

Quiet _____

Unwound _____

Tranquil _____

Soft _____

Composed _____

Mellow _____

Serene _____

DIRECTIONS: Indicate how you were feeling before participating in the relaxation session.

1=least and 10=highest level of each feeling.

By Elizabeth Miles (1997)

Appendix H

Rancho Los Amigo Scale*

LEVELS OF COGNITIVE FUNCTIONING

I. NO RESPONSE

Patient appears to be in a deep sleep and is completely unresponsive to any stimuli presented to him.

II. GENERALIZED RESPONSE

Patient reacts inconsistently and non-purposefully to stimuli in a non-specific manner. Responses are limited in nature and are often the same regardless of stimulus presented. Responses may be physiological changes, gross body movements and/or vocalization. Often the earliest response is to deep pain. Responses are likely to be delayed.

III. LOCALIZED RESPONSE

Patient reacts specifically but inconsistently to stimuli. Responses are directly related to the type of stimulus presented as in turning head toward a sound, focusing on an object presented. The patient may withdraw an extremity and/or vocalize when presented with a painful stimulus. He may follow simple commands in an inconsistent, delayed manner (i.e. closing his eyes, squeezing or extending an extremity). Once external stimuli are removed, he may lie quietly. He may also show a vague awareness of self and body by responding to discomfort by pulling at nasogastric tube or catheter or resisting restraints. He may show a bias toward responding to some persons (especially family, friends), but not to others.

IV. CONFUSED-AGITATED

Patient appears alert and is able to respond to simple commands fairly consistently. However, with increased complexity of commands or lack of any external structure, responses are non-purposeful, random, or at best, fragmented toward any desired goal. He may show agitated behavior, but not on an internal basis (as in Level IV), but rather as a result of external stimuli, and usually out of proportion to the stimulus. He has gross attention to the environment, but is highly distractible and lacks ability to focus attention to a specific task without frequent redirection back to it. With structure, he may be able to converse on a social-automatic level for short periods of time. Verbalization is often

inappropriate; confabulation may be triggered by present events. His memory is severely impaired, with confusion of past and present in his reaction to ongoing activity. Patient lacks initiation of functional tasks and often shows inappropriate use of objects without external direction. He may be able to perform previously learned tasks when structured for him, but is unable to learn new information. He responds best to self, body, comfort and often family members. The patient can usually perform self-care activities with assistance and may accomplish feeding with maximum supervision. Management on the ward is often a problem if the patient is physically mobile, as he may wander off either randomly or with vague intention of "going home".

VI. CONFUSED-APPROPRIATE

Patient shows goal-directed behavior, but is dependent on external input for direction. Response to discomfort is appropriate and he is able to tolerate unpleasant stimuli (As NG tube) when need is explained. He follows simple directions consistently and shows carry-over for tasks he has relearned (as self-care). He is at least supervised with old learning; [and is] unable to [function or must be] maximally assisted for new learning with little or no carry-over. Responses may be incorrect due to memory problems, but they are appropriate to the situation. They may be delayed to immediate [responses] and he shows decreased ability to process information with little or no anticipation or prediction of events. Past memories show more depth and detail than recent memory. The patient may show beginning immediate awareness of situation by realizing he does not know an answer. He no longer wanders and is inconsistently oriented to time and place. Selective attention to tasks may be impaired, especially with difficult tasks and in unstructured settings, but is now functional for common daily activities (30 min. With structure). He may show a vague recognition of some staff, has increased awareness of self, family and basic needs (as food), again in an appropriate manner as in contrast to Level V.

VII. AUTOMATIC-APPROPRIATE

Patient appears appropriate and oriented within hospital and home settings, goes through daily routine automatically, but frequently robot-like, with minimal to absent confusion, but has shallow recall of what he has been doing. He shows increased awareness of self, body, family, foods, people and interaction in the environment. He has superficial awareness of, but lacks insight into his condition, decreased judgment and problem-solving and lacks realistic planning for his future. He shows carryover for new learning, but at a decreased rate. He requires at least minimal supervision for learning and for safety purposes. He is independent in self-care activities and supervised in home and community skills for safety. With structure he is able to initiate tasks as social or recreational

activities in which he now has interest. His judgment remains impaired, such that he is unable to drive a car. Pre-vocational or avocational evaluation and counseling may be indicated.

VIII. PURPOSEFUL AND APPROPRIATE

Patient is alert and oriented; is able to recall and integrate past and recent events; and is aware of and responsive to his culture. He shows carryover for new learning if acceptable to him and his life role, and needs no supervision once activities are learned. Within his physical capabilities, he is independent in home and community skills, including driving. Vocational rehabilitation to determine ability to return as a contributor to society (perhaps in a new capacity), is indicated. He may continue to show a decreased ability, relative to premorbid abilities, in abstract reasoning, tolerance for stress, judgment in emergencies or unusual circumstances. His social, emotional and intellectual capacities may continue to be at a decreased level for him, but functional in society.
*Prepared by: C. Hagen, D. Malkmus, P. Durham,, and K. Bowman of Rancho los Amigos Hospital, Adult Head Trauma Service.

Appendix I

GLOSSARY OF TERMS

ACQUIRED BRAIN INJURY: a brain injury that occurs after birth, resulting in a change in neuronal activity which effects the physical integrity, metabolic activity or the functional ability of the cell. Acquired brain injury may result in mild, moderate or severe impairments in one or more areas of cognition, speech-language communication, memory, attention & concentration, reasoning, abstract thinking, physical functions, psycho social behavior, and information processing.

ANXIETY: A state of being uneasy, apprehensive, or worried about what may happen. An intense state of this kind characterized by varying degrees of emotional disturbance and psychic tension.

CLOSED HEAD INJURY: An injury in which there is damage to the brain, or at least a disruption of normal brain function. Symptoms may be transient or permanent. Individuals differ in response to initial symptoms. Personality and environmental factors interact with the primary deficits to determine functional disability. These primary deficits include: a shaken sense of self; a cycle of failure; fear; avoidance; anxiety; depression; loss of self-esteem; isolation; and attention deficits.

GENERALIZED ANXIETY DISORDER: The presence of generalized, persistent anxiety for at least one month, as manifested by symptoms from at least three of four categories that include motor tension, autonomic hyperactivity, apprehensive expectation, and vigilance/scanning. Other characteristics include uncontrollable worry; less emphasis on autonomic symptoms; restlessness or feeling on edge; being easily fatigued; difficulty concentrating or the mind going blank; irritability; muscle tension; and sleep disturbance.

MUSIC AND RELAXATION THERAPY: A form of relaxation therapy in which the person sits in a chair or lies down, and concentrates on focusing his attention on various muscle groups in his body, while listening to simultaneous verbal directions and soft, soothing, relaxing music, and lets go of accumulated tension, both physically and emotionally.

MILD TRAUMATIC BRAIN INJURY: A brain injury that has had a traumatically induced physiological disruption of brain function as manifested by at least one of thefollowing: loss of consciousness; loss of memory for events immediately before or after the accident, any alteration in mental state at the time of the accident (feeling dazed, disoriented or confused), and focal neurological deficits that may or may not be transient; but where the severity of the injury does not exceed the following:loss of consciousness of approximately 30 minutes or less;

after 30 minutes, an initial Glastow Coma Scale (GCS) of 13-15; and posttraumatic amnesia (PTA) not greater than 24 hours.

NEURO-REHABILITATION CENTER: A rehabilitation center that specializes in medical, psychotherapy, speech therapy, occupational therapy, recreation therapy, physical therapy, music therapy, and other related treatments for patients suffering from traumatic and closed brain injury.

PROGRESSIVE RELAXATION THERAPY: A form of relaxation therapy developed by Dr. Edmund Jacobson in the 1960's in which the person sits in a chair or lies down, tenses his muscles and then relaxes them to release built-up tension in the body.

RELAXATION THERAPY: A form of relaxation therapy developed by Robert Griswold (1975) in which the person sits in a chair or lies down and listens to a narrative script of instructions from the therapist to focus on certain areas of his body and allows them to relax.

STATE ANXIETY: A palpable reaction or process taking place at a given time and level of intensity. Anxiety characteristics include subjective feelings of tension, apprehension, nervousness, worry, and activation or arousal of the autonomic nervous system (Spielberger, 1983).

STRESS: The physical and emotional result of stimuli that produces any physiological and/or emotional activation of the stress response such as fear or anxiety. When stress levels exceed the coping threshold of a person, pathological changes may occur. Anxiety has been shown to reflect dysregulation of the stress response.

TRAIT ANXIETY: Relatively stable differences in anxiety-proneness in the tendency to perceive stressful situations as dangerous or threatening and to respond to such situations with elevations in the intensity of state anxiety reactions (Spielberger, 1983).

TRAUMATIC BRAIN INJURY: An insult to the brain, not of a degenerative or congenital nature, caused by an external physical source that may produce a diminished or altered state of consciousness, resulting in an impairment or cognitive abilities, physical function, or both. It can result in behavioral or emotional disorders. These impairments may be either temporary or permanent, causing partial or total functional disability or psycho social maladjustment.

MICHIGAN STATE
UNIVERSITY

September 1, 2000

TO: Roger SMELTEKOP
317 Music Practice Bldg.

RE: **IRB# 00-389** CATEGORY:2-C
APPROVAL DATE: September 1, 2000

TITLE: THE EFFECTS OF MUSIC AND RELAXATION THERAPY ON ANXIETY IN CLOSED HEAD INJURY PATIENTS

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.
REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.
PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/user/ucrihs

Sincerely,

Ashir Kumar, MD
Interim Chair, UCRIHS

AK: bd
cc: Barbara Carlisle
P.O. Box 0262
Okemos, MI 48805-0262

OFFICE OF
RESEARCH AND GRADUATE STUDIES
sity Committee on lesearch Involving Human Subjects
ıigan State University
ministration Building
st Lansing, Michigan 48824-1046
517/355-2180
FAX: 517/353-2976
.msu.edu/user/ucrihs
ail: ucrihs@msu.edu

APPENDIX K

ANXIETY LEVEL FIGURES

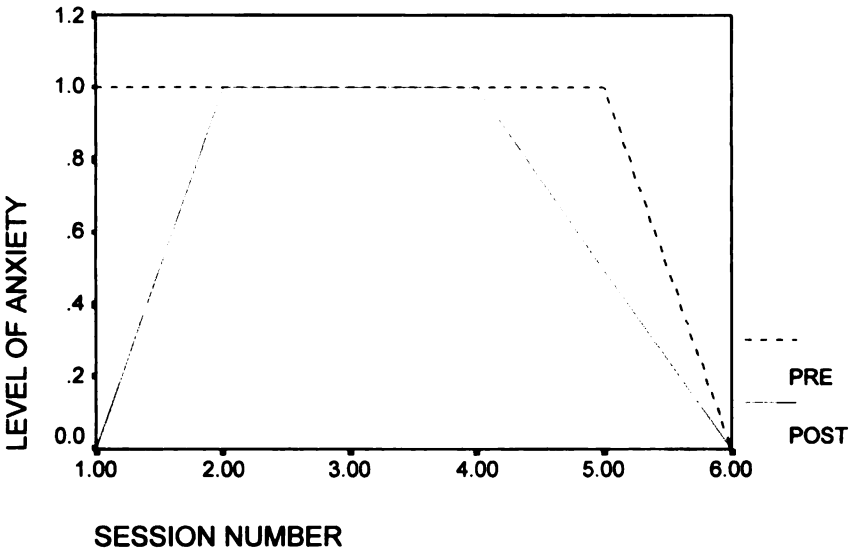


Figure 1. Anxiety Levels of Subject A in the Experimental Group Across Six Sessions.

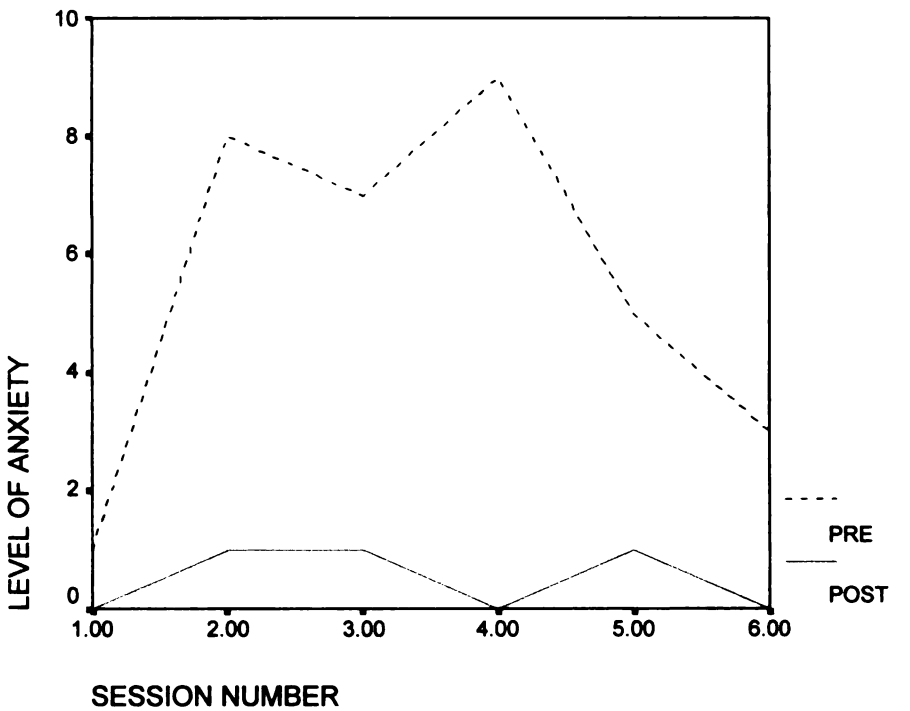


Figure 2. Anxiety Levels of Subject B in the Experimental Group Across Six Sessions.

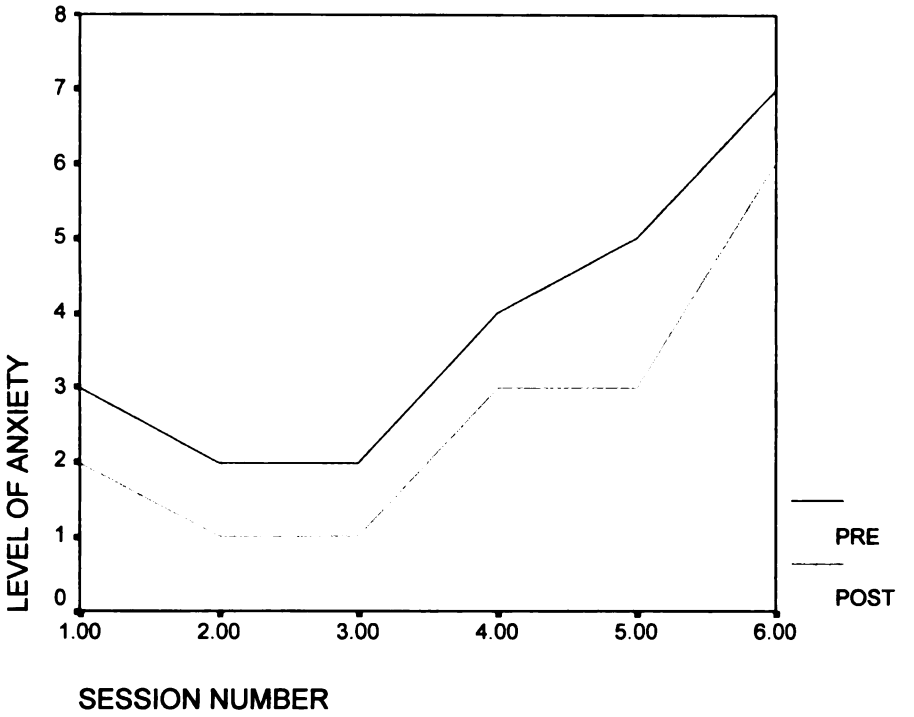


Figure 3. Anxiety Levels of Subject C in the Experimental Group across Six Sessions.

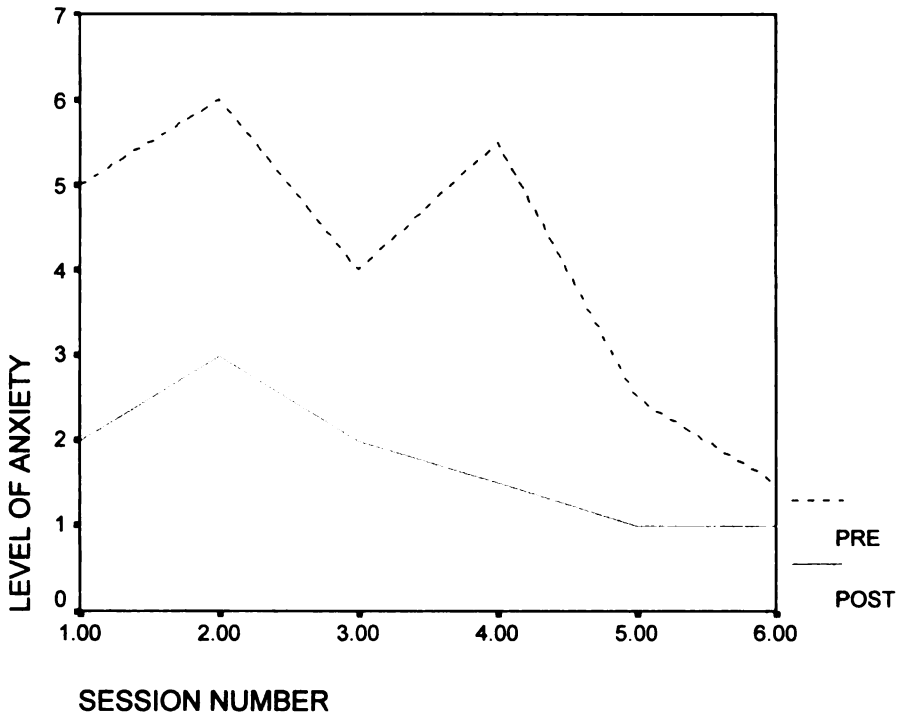


Figure 4. Anxiety Levels of Subject D in the Experimental Group across Six Sessions.

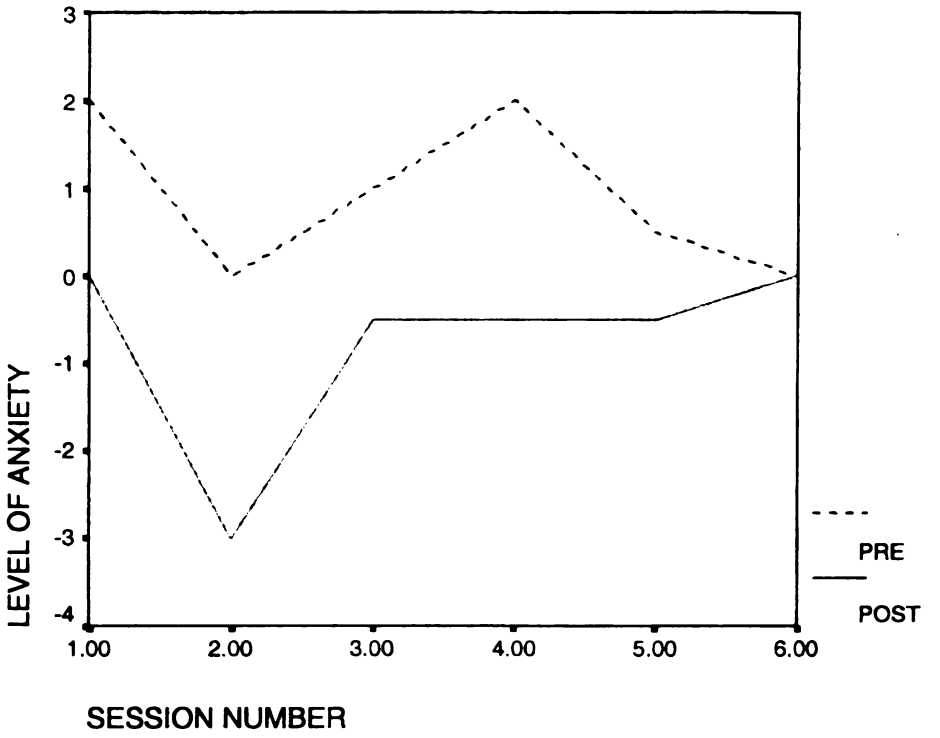


Figure 5. Anxiety Levels of Subject E in the Experimental Group across Six Sessions.

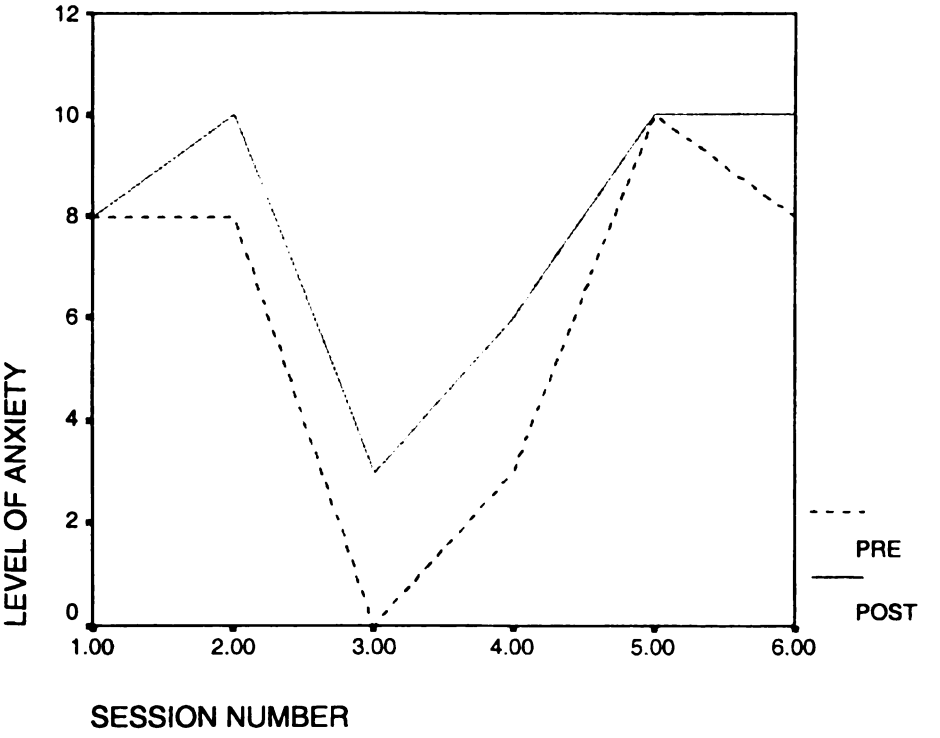


Figure 6. Anxiety Levels of Subject F in the Experimental Group across Six Sessions.

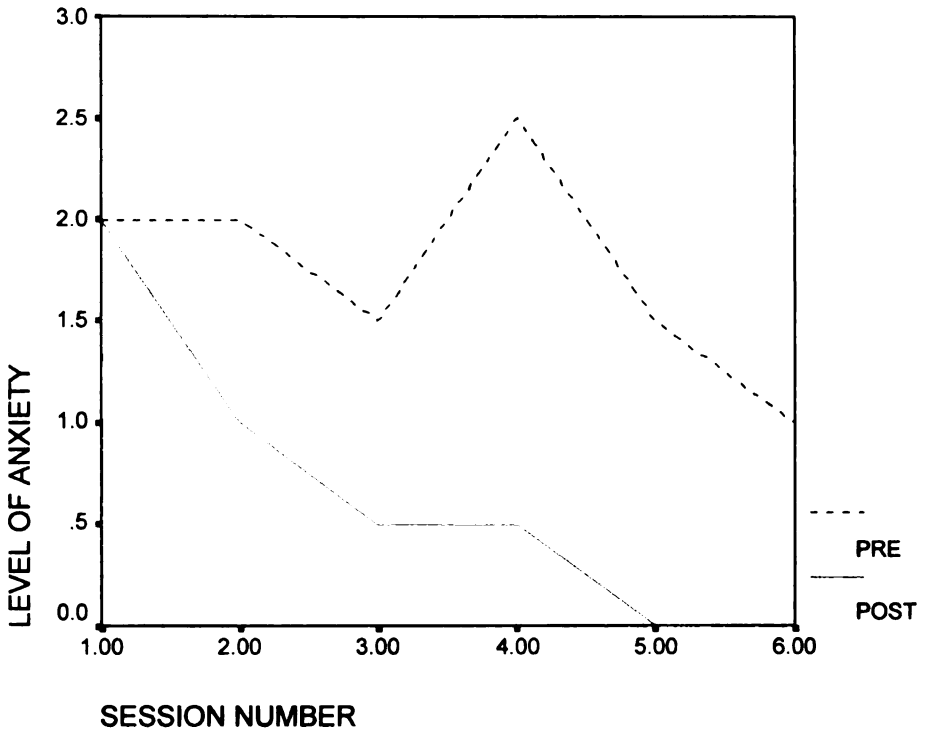


Figure 7. Anxiety Levels of Subject G in the Experimental Group across Six Sessions.

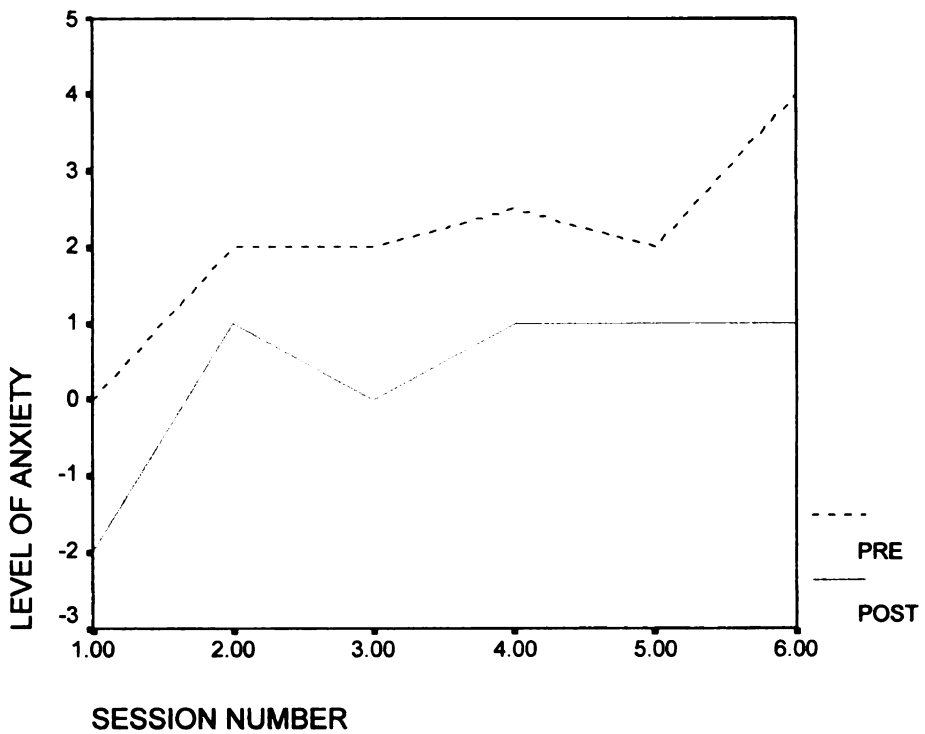


Figure 8. Anxiety Levels of Subject A in the Control Group across Six Sessions.

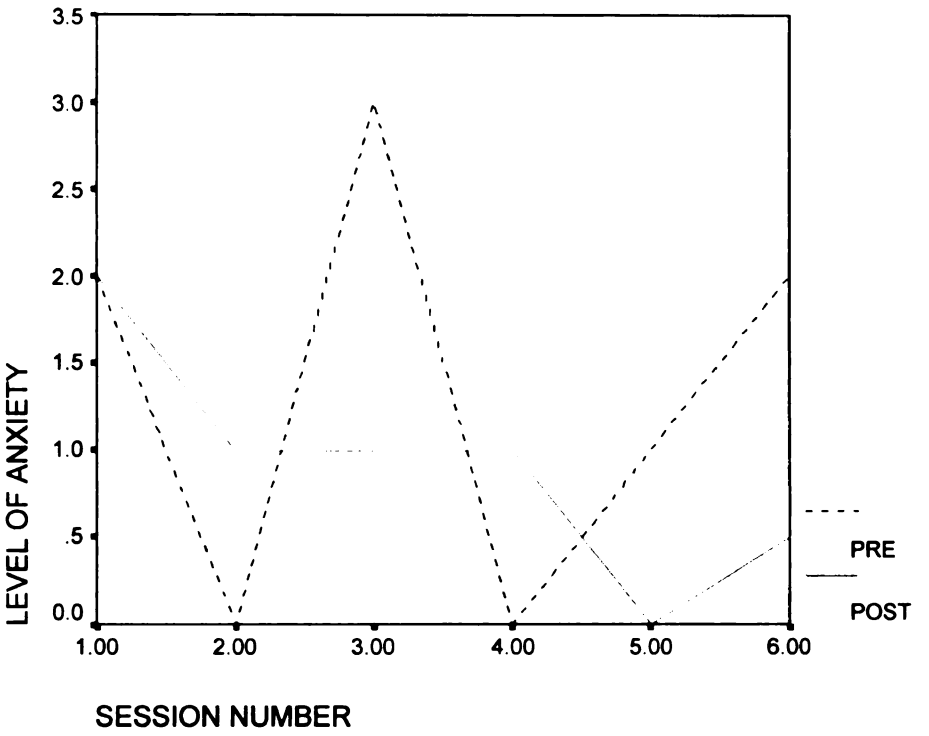


Figure 9. Anxiety Levels of Subject B in the Control Group across Six Sessions.

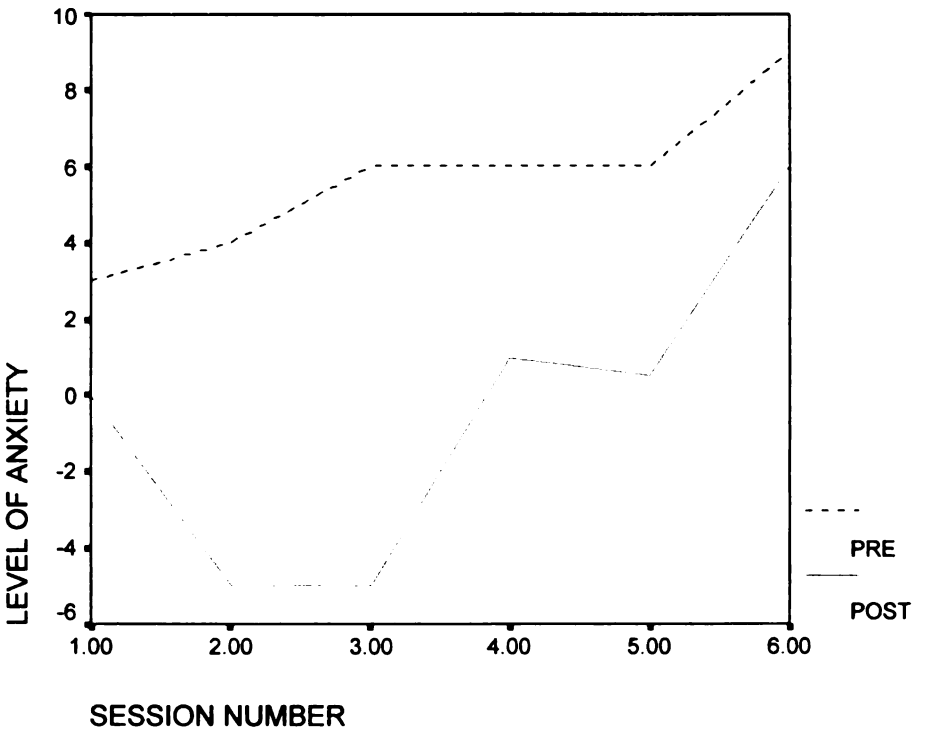


Figure 10. Anxiety Levels of Subject C in the Control Group across Six Sessions.

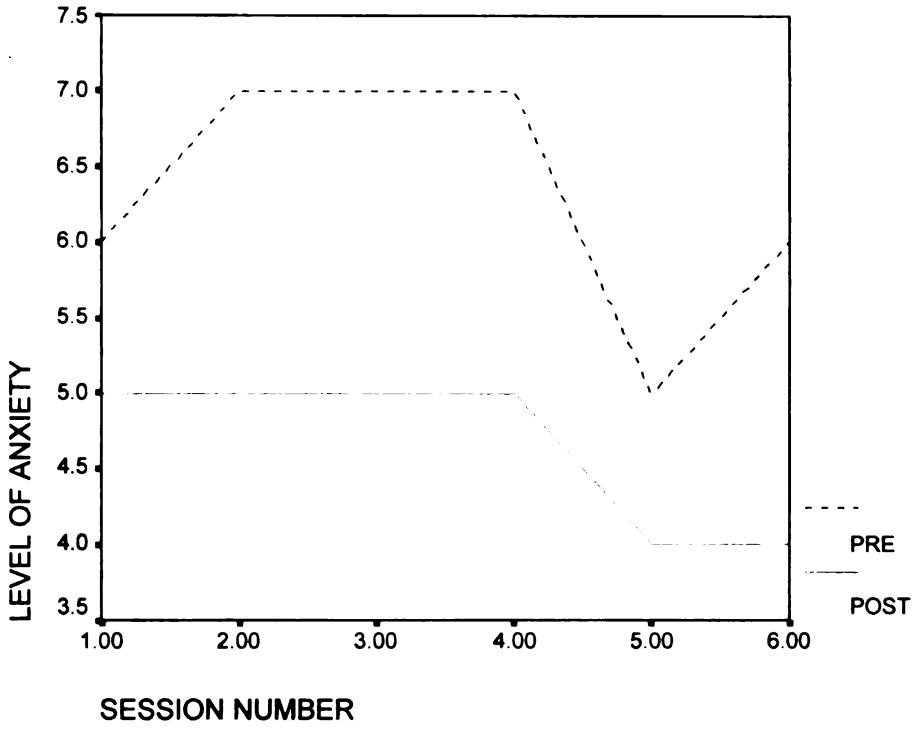


Figure 11. Anxiety Levels of Subject D in the Control Group across Six Sessions.

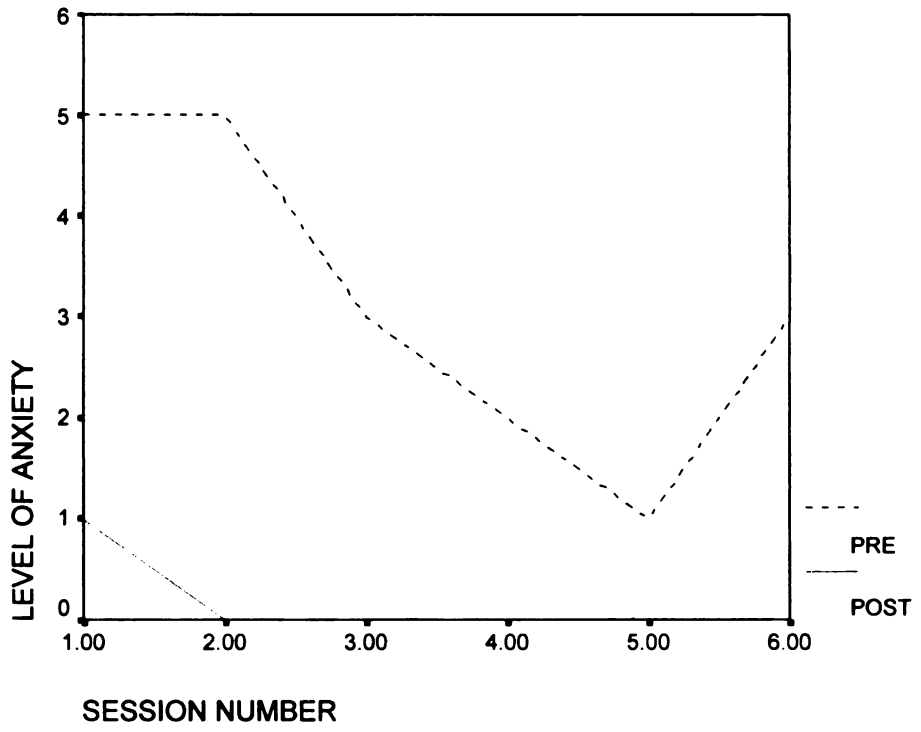


Figure 12. Anxiety Levels of Subject E in the Control Group across Six Sessions.

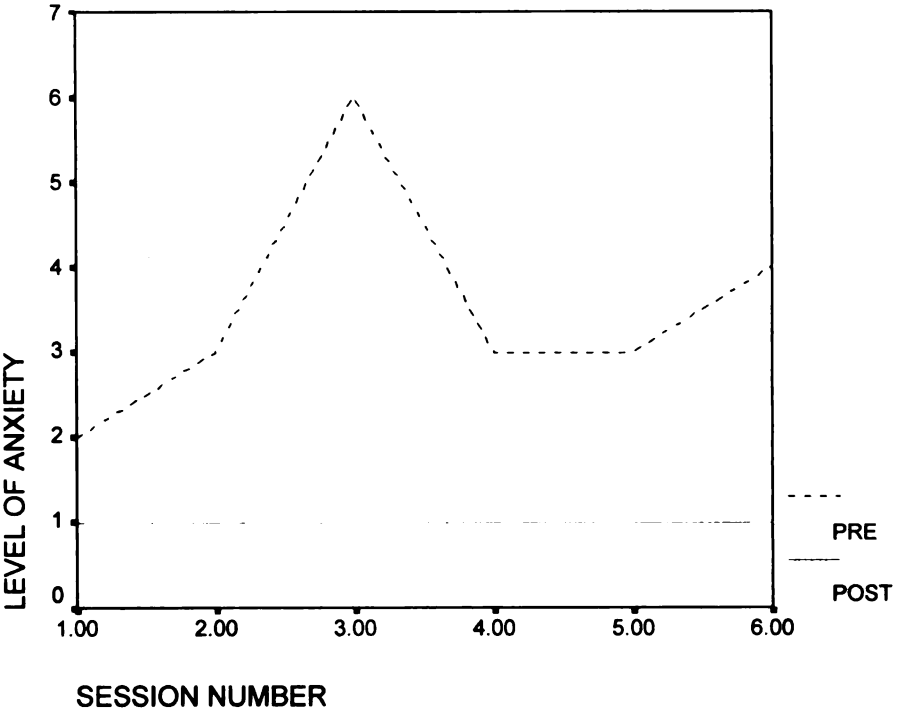


Figure 13. Anxiety Levels of Subject F in the Control Group across Six Sessions.

Appendix L

Age Distribution of Subjects