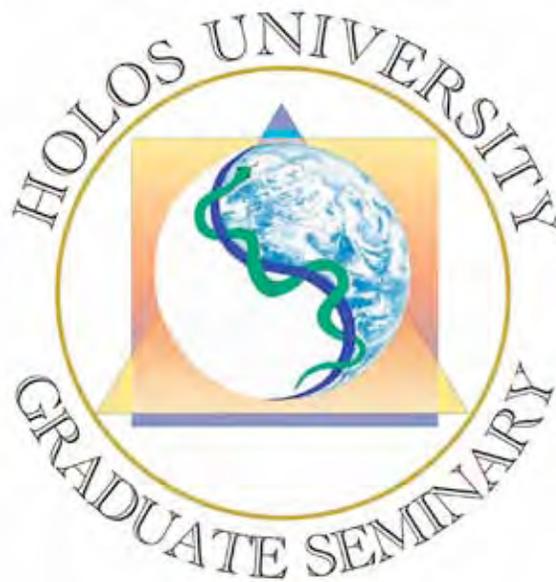


**Assessment of Changes in  
Brainwave Patterns and Physiological Markers of  
Subjects Receiving Healing Touch –  
A Randomized Controlled Trial**

by  
Denise Mary Anthes



Dissertation  
submitted to the Faculty of  
Holos University Graduate Seminary  
in partial fulfillment of the requirements  
for the degree of

**DOCTOR OF THEOLOGY**

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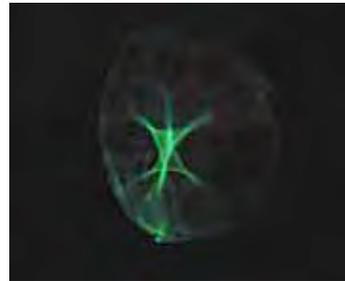
The work reported in this thesis is original and carried out by me solely, except for the acknowledged direction and assistance gratefully received from colleagues and mentors.

---

Denise Mary Elizabeth Joy Anthes

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## ABSTRACT

### **Assessment of Changes in Brainwave Patterns and Physiological Markers of Subjects Receiving Healing Touch – A Randomized Controlled Trial**

This study evaluated the impact upon the physiology and state of consciousness of recipients of Healing Touch offered by a certified practitioner. Healing Touch (HT) uses gentle hand movements on or near the body, to clear and balance human energy fields. Reduction in stress and pain are well documented benefits for recipients of Healing Touch. Some studies have focused on changes in physiology of practitioners or recipients. Little is documented on the effects on states of consciousness of participants of Healing Touch and other biotherapies. This was a randomized controlled study of 68 subjects. Fifty-six percent of the subjects were female; forty four percent male. Age range was eighteen to ninety-one years. The study measured changes in five parameters: electroencephalography (EEG), skin conductivity, blood volume and pulse (BVP), respiration, and temperature. These measurements were recorded constantly during each twenty-eight minute session. Additionally, the procedure consisted of recording two minute baseline EEG readings: with eyes closed, then with eyes open. Then the Control Group relaxed for twenty minutes while the Intervention Group received a twenty minute ‘dose’ of Healing Touch. The session concluded with a repetition of two minute baseline EEG recording with eyes closed, then two minutes with eyes open. The intervention group had increased activation in all brainwaves patterns. There was a statistically significant difference ( $p = .03$ ) in the decrease in anxiety of the intervention group as compared to the control group, with a CI of 95%. The results justify larger studies. Suggestions for future studies are included.

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# CHAPTER 1: INTRODUCTION

## Background of Problem

### Stress and Relaxation

Stress and relaxation are opposite sides of the same coin, in a physiological sense. Organisms, including humans, are constantly balancing fluids, electrolytes, hormones, and neurotransmitters in order to keep us stable or in *homeostasis*. Walter Cannon, a Harvard physiologist, is credited with first using this term to describe the dynamic state of balance that organisms attempt to maintain in constantly changing environments.<sup>1</sup> Hans Selye is considered to be the father of the stress response, and the general adaptation syndrome (GAS), as well as a ground breaking pioneer who identified and defined the role of stress and hormones in many disease states. Since the 1930s he has written more than 30 books and over 1,500 scientific articles related to stress and its impact upon health. In the mid 1970's, Dr. Herbert Benson promoted the concept of the *relaxation response*, which facilitates specific processes for stimulating parasympathetic or relaxation functions in the body. These pioneers formed a foundation of knowledge and understanding that guides much of the mind-body-spirit research and practices today. A total exploration of their work is outside the scope and depth of this paper. Their contributions to understanding stress and relaxation create a starting point for this research project.

## **Brainwave Patterns**

Certain brainwave patterns are associated with normal states of consciousness. Others are associated with disease states (tumors) or mental health issues. To maintain good health, humans need to move in and out of various brainwave patterns during the course of each day. Electroencephalography, or EEGs, have been used to study brainwave patterns and states of consciousness in humans since Hans Berger invented the technology in 1924.

The use of clinical EEGs first appeared in the mid 1930s. For many years the primary use of EEG was focused on research into epilepsy and psychiatric diseases. In the 1970s EEG technology was utilized in the fledgling field of biofeedback by pioneers like Alyce and Elmer Green.<sup>2</sup> Psychophysiological retraining with biofeedback opened doors (and minds) and empowered people with tools for self regulation. People found that when they changed their thoughts, they could change their physiology (relax). As technology advanced and Cognitive Neuroscience developed, the EEG also gained a new role in this evolving field, as it assisted in demonstrating shifts from sympathetic (aroused) to parasympathetic (relaxed) states within the body. Neurobiofeedback has been shown to assist with performance enhancement,<sup>3</sup> mood,<sup>4</sup> and attainment of enhanced alpha states.<sup>5</sup>

## **Biofield Therapies**

The National Institute of Health (NIH) formed the National Center for Complementary and Alternative Medicine (NCCAM) during the Clinton Administration. Its purpose is to define various modalities, promote research of complementary modalities, and provide education and protection to the public This organization uses the

phrase ‘biofield therapy’ to refer to hands-on-healing modalities which include Healing Touch.<sup>6</sup> The goal of this type of therapy is to restore balance and harmony to the energy field, which can be impacted (depleted, disrupted, disturbed or enhanced) by daily encounters and events.

NCCAM defines *biofield* as “A vital energy or life force that is believed by many energy medicine practitioners to flow throughout the body. The existence of biofields has not been scientifically proven, and they have not been measured by conventional instruments.”<sup>7</sup> Although *biofield therapy* interventions are usually very specific (intentionality, hand placement), the efficacy impacts multiple layers of body-mind-spirit and therefore can be non-specific. The goal is often to regulate or balance energy flow within the organism (person), thereby enhancing specific and non-specific areas of well-being. Specific symptoms such as pain, nausea or anxiety can be addressed. Enhancing general well-being or increasing the client’s energy level can also be a goal.

The dearth of research regarding changes in states of consciousness during biofield therapy sessions begs for exploration. Combining EEG measurement with other biophysical markers will contribute to the body of knowledge regarding the efficacy of biotherapies.

## **Healing Touch**

Healing Touch (HT) uses gentle hand movements on or near the body, to clear and balance human energy fields. It is a form of energy medicine that falls under the NCCAM category of biotherapy modalities. Healing Touch was developed by Janet

Mentgen<sup>1</sup>, RN, in the late 1980s. Mentgen had practiced energy therapies since the 1970s, beginning with Therapeutic Touch (TT),<sup>8</sup> and had advanced her skills and knowledge while studying with indigenous, religious and healthcare healers. Mentgen was recipient of the American Holistic Nurses Association (AHNA) Nurse of the Year Award in 1988. The AHNA then requested that she develop a full certification program from the continuing education program for Healing Touch. Healing Touch Program (HTP) evolved a standardized curriculum which includes five levels of education, from beginner to advanced practice. Level 4 begins at least a year of mentorship and a client-healer practicum, which can lead to certified practitioner status.

Healing Touch Program is endorsed by the American Holistic Nurses Association and is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's (ANCC) COA. Guidelines for students and practitioners include a Code of Ethics and Standards of Practice. An autonomous certification board reviews applications for HTCP status, and ethics and research committees offer advisory assistance. Once international certification is attained, a practitioner is designated as a *Healing Touch Certified Practitioner* or *HTCP*.

The Healing Touch Program Website explains how HT and other energy or biofield therapies impact healing:

Energy therapies focus on removing energy congestion that form in our energy fields (aura) and energy centers (chakras). Once these imbalances and disturbances are cleared, the energy channels resume their task of integrating the body, mind and soul to restore health and promote healing.<sup>9</sup>

Healing Touch students and practitioners collaborate with other healthcare professionals. Many, but not all practitioners are nurses. Healing Touch is a

complement to traditional, allopathic healthcare and offers a gentle, non-invasive adjunct for healing on all levels: body, mind and spirit. Healing Touch restores balance and harmony to the natural biofield without the use of pharmaceuticals.

Healing Touch is taught in 34 countries, including North, Central and South America, Europe, Africa, Australia, Asia, and New Zealand.<sup>10</sup> Over 80,000 students have studied the HT techniques and concepts. Healing Touch is offered to clients and patients in hospitals, hospices, clinics, long term care centers, mental health facilities, substance abuse centers, community outreach programs, churches, health fairs, homes, schools and other settings.

In the past twenty years, many studies involving Healing Touch have been conducted cross the world. Some studies have focused on changes in the physiology of practitioners or recipients of Healing Touch. Others focus on psycho-social measures of well-being or coping. Some research is sound and other studies do not meet the standards of either CONSORT 2010,<sup>11</sup> the 2005 National Academy of Science Institute of Medicine Report on CAM use in America,<sup>12</sup> or scientific rigor. Valid research has shown that Healing Touch facilitates relaxation and enhances the healing process. Reduction in pain, anxiety, fatigue and enhanced quality of life are also documented benefits for recipients of Healing Touch.

It is critical to continue careful design, implementation and dissemination of scientifically rigorous qualitative and quantitative studies to validate the efficacy and impact of Healing Touch and other holistic, non-invasive modalities.

While physiological parameters such as changes in temperature, blood pressure, respiration, heart rate variability and skin conductivity have been measured related to the

relaxation response and stress, no studies correlating changes in brainwaves and energy healing modalities have been found in the literature. Limited research is available regarding changes in brainwave patterns during acupuncture, but none have measured changes during or after energy balancing modalities including Reiki, Therapeutic Touch, or Healing Touch.

This study integrated information regarding the physiological responses to relaxation related to pulse, respiration, temperature and skin conductivity with self-reported ranking of anxiety and pain. Additionally, changes in dominant brainwave patterns related to relaxation associated with Healing Touch (Intervention Group) and Control Group participants were recorded and analyzed.

### **Statement of the Problem**

Although many studies have shown efficacy of energy modalities for decreasing pain and anxiety, none have correlated the brainwave pattern changes that accompany relaxation which occurs as a result of receiving a Healing Touch session. This study was designed to expand the field of knowledge regarding the mind-body-spirit connection as it relates to relaxation resulting from human touch, as demonstrated by a twenty minute 'dose' of Healing Touch .

### **Purpose and Importance of the Study**

The purpose of this study is to fill a gap in scientific knowledge as there are very limited published studies documenting changes in brainwave patterns with energy therapies. Three studies involving acupuncture were found and are discussed in the Literature Review section of this document. This study attempted to determine if there is

a difference in changes in brainwave patterns between subjects receiving Healing Touch as an intervention, and those who relaxed for 20 minutes. A secondary purpose was to measure physiological changes. Lastly, changes in pre- and post-intervention anxiety and levels were measured for both groups. The American Psychological Association's 2010 Stress in America Survey (n=1,228 online respondents; and 300 caregivers; plus 1,221 more people living with chronic illnesses) demonstrated that 75% of respondents reported that their stress levels are so high that they feel unhealthy.<sup>13</sup> With anxiety affecting such a high percentage of the population, determining efficacy of energy modalities related to decreased anxiety is important.

### **Statement of Research Questions**

- Is there a difference in brainwave patterns between subjects receiving a 20 minute dose of Healing Touch and those who relax for 20 minutes?
- Is there a relationship between receiving Healing Touch and parasympathetic dominance, as measured by physiological parameters of temperature, respiration, heart rate and skin conductivity?
- Is there a relationship between receiving Healing Touch and decrease in anxiety or pain levels?

### **Hypotheses**

1. Research results will demonstrate a relationship between changes in brainwave patterns and receipt of Healing Touch session.
2. Research results will show physiological correlates that demonstrate the efficacy of Healing Touch as it relates to relaxation and parasympathetic dominance.

3. Research results will demonstrate a relationship between reduced anxiety and receipt of Healing Touch session.

### **Null Hypotheses**

1. Research results will not demonstrate a change in brainwave patterns related to receipt of a Healing Touch session.

2. Research results will not show physiological correlates that demonstrate the efficacy of Healing Touch as it relates to relaxation and parasympathetic dominance.

3. Research results will not demonstrate a relationship between reduced anxiety or pain and receipt of a Healing Touch session.

### **Definition of Terms**

**Alpha rhythm** - 8-12 Hz; a brainwave pattern seen in an awake but relaxed state of consciousness; resting brain; this rhythm increases from early childhood to adulthood, declining again later in life

**Allostasis** - (as defined by Sterling and Eyer) an organism's ability to maintain stability through change, by adapting to constantly changing environments

**Amplitude** - ( $\mu\text{V}$ ) voltage or height of waveform from peak to peak; correlates with number of neurons firing at any given time

**Arousal continuum** - extends from coma, sleep, awakeness, alertness, hyper-alertness to mania; shifts occur along this continuum from moment to moment

**Artifacts** - may include electrical interference, equipment defects, user error, excessive movement or physiological issues (medications, nicotine, alcohol usage); artifacts in and EEG tracing are assessed and are usually filtered out of the tracings during or prior to analysis

**Beta rhythm** - 13-30 Hz; brainwave pattern seen in an awake, alert focused state of consciousness

**Biofeedback** - use of a machine to *feedback* what the physical body is doing; used to re-train responses to stimuli and situations

**Brainwave patterns** - graphic or digital representations of the frequency, amplitude and phase of various patterns associated with functions and electrical activity in the brain; patterns include delta, theta, thalpa, low alpha, high alpha, beta and gamma

**Coherence** - harmonious synchronization of body systems - often seen with respiration and pulse in a coherent organism

**Delta rhythm** - 0.5 - 4 Hz; brainwave pattern of early stage of sleep; light sleep

**Distress** - unpleasant or disease producing stress resulting from stimulation

**Electroencephalogram** - (EEG); first printed on paper by Dr. Hans Berger, an EEG records the electrical activity and frequency of impulses generated in different areas of the brain

**Eustress** - pleasant stimulation or arousal, as seen in achievement, sexual arousal, love

**Fight-or-flight Response** - first described by Dr. Walter B. Cannon of the Harvard Medical School in the 1920's, this describes a complex response initiated by the sympathetic nervous system, in response to threat of harm. Hormones and neurotransmitters flood the body in preparation to fight for survival or run away from the danger. Dilated pupils, increased heart and respiratory rates, blood shunting to large muscles and more primitive areas of the brain, while moving away from digestive, reproductive and other non-essential areas, are some key elements of the response. Originally a survival mechanism, today it is often stimulated in a chronic manner, where no release of tension (flight/fight) occurs, resulting in increased vulnerability to disease.

**Hertz** - (Hz) cycles per second; used to measure the speed of electrical activity

**High Alpha** - 11-12 Hz; brainwave pattern associated with awake, relaxed state of consciousness; increases from early childhood to adulthood

**Low Alpha** - 8-10 Hz; brainwave pattern in awake, very relaxed state - 'idle brain'

**Neurobiofeedback** - using machines to indicate brain activity during stimulation and activity; used for diagnosis and to re-train responses to stimuli and situations

**Orienting Reflex or Anticipatory Stress Response** - brief sympathetic response by the body in response to a new stimulus; purpose is orientation, recognition and determination of appropriate response – fight/flight or relaxation

**Parasympathetic dominance** - a physiological state where heart rate, respirations and blood pressure decrease, and circulation to non-vital organs (skin, stomach, extremities) increases as the body rests; also includes decreased metabolic requirements including oxygen consumption

**Relaxation response** - popularized by Dr. Herbert Benson, this set of steps including focusing on a word, slowing breathing and relaxing the physical body, has been shown to reverse effects of chronic stress; the specific steps of Dr. Benson's method create a deep relaxation that counteracts sympathetic nervous system responses

**Skin conductivity** - measures electrical conductivity or resistance on the surface of the skin by sending a mild electrical current from a sensor on one finger to a sensor on another finger; skin conductivity has been associated with increased relaxation

**Startle reflex** –widening of pupils, muscular contraction and breath holding pattern associated with sudden addition of stimulus to the conscious environment

**Stimulus** - anything that elicits a response in the entire body or part of the body (or organism)

**Sympathetic dominance** - a state of arousal where hormones create elevated blood pressure, heart rate, temperature, oxygen consumption, blood clotting and enhanced circulation to vital organs; chronic arousal can lead to disease processes and exhaustion

**Thalpa rhythm** - 4 - 10 Hz; a bandwidth that encompasses the Theta + Low Alpha brainwave patterns seen together. It's useful for some clinicians when they want to examine or train both bandwidths as a single number

**Theta rhythm** - 4 - 7 Hz; brainwave pattern seen in a drowsy state of consciousness; moving into or out of delta or light sleep; hypnagogic state; theta bursts associated with inspiration in problem solving; higher in children, decreasing in adulthood

## **CHAPTER 2: LITERATURE REVIEW**

The Literature Review is intended to offer the reader an overview of existing research which acts as a foundation for, or is related to the current study. First, this paper will explore research on relaxation and stress. Next the paper will address the relationship between brain wave patterns and human states of consciousness. Review of the literature regarding practitioner experience, the importance of establishing a standard 'dose' for the study and the efficacy of Healing Touch will follow.

Theoretical frameworks for this study include Benson's *relaxation response*, which focuses on the shift from sympathetic to parasympathetic system dominance and Benner's *novice to expert* nursing theory, which is adapted from Dryfuss and Dryfuss' model of skill acquisition. Changes in physiological markers will demonstrate the shift towards parasympathetic activation and the use of an 'expert' practitioner will enhance the study.

### **Relaxation and Stress**

Stress can be defined as any change in the environment of an organism, which requires adaptation to remain homeostasis. Stress can be triggered by internal (thoughts, feelings, habits or responses) or external (people, situations) events. Short term stress can be beneficial as a means of survival while chronic or long term stress has been related to development or worsening of disease states.

Pleasant situations (eager anticipation, love, accomplishment) also cause 'stress' or a response of physiological, emotional, and mental stimulation. <sup>14</sup>

The impact of stress depends upon many factors, including duration of time, frequency of re-occurrence, and perception of event(s). Responses include physiological, biochemical, mental, emotional and spiritual components. <sup>15</sup>

Sympathetic nervous system activation results from the 'stress trigger'. This response includes heightened sensual acuity: vision, hearing, and smell are enhanced. Motor coordination increases and reaction time generally decreases. Oxygen availability (through increased respiratory and heart rate) and consumption occur. <sup>16</sup>

### **Physiological Changes with Relaxation Response**

Several physiological parameters are involved in transitioning from a stressed or sympathetic nervous system dominance, to a relaxed or parasympathetic dominant state. These include changes in blood pressure, pulse, respiratory rate, peripheral skin temperature and skin conductivity. Four of these parameters will be measured in the current study, in addition to recording electrical activity in the brain during relaxation.

### **Brainwave Patterns**

Although all patterns are present to some degree in every living moment, the dominance of particular brainwave patterns has been correlated with specific states of consciousness. Information will be presented on basic brainwave patterns, as seen on electroencephalogram (EEG), with correlations to human states of consciousness.

Although empirical data exists on changes in brainwave patterns during acupuncture, a

literature review found no results for EEG monitoring of recipients of Healing Touch, Therapeutic Touch, Reiki and other biofield therapies.<sup>17</sup>

Documentation of shifts in brainwave dominance and biophysical markers can provide useful correlational information regarding the impact of biofield therapies. A fairly large body of research exists which demonstrates physiological changes related to receipt of biotherapies such as Reiki, Therapeutic Touch and Healing Touch.<sup>18</sup> A knowledge gap in the research exists related to changes in EEG brainwave patterns and changes in states of consciousness related to the relaxation effects of biofield therapies. Understanding this important link can lead to scientific advancement as well as practical information which may enhance health and well-being.

Current neurological data estimates 100 billion neurons exist in the human brain.<sup>19</sup> Neurons use electrical impulses to communicate with each other. Any number of these neurons can be ‘firing’ across neural synapses at one time. The synchronization of millions of neurons sending signals simultaneously produces an enormous amount of electrical activity in the brain, which can be detected externally or internally.<sup>20</sup> Non-invasive, yet sensitive medical equipment, such as an *electroencephalogram* can measure patterns of electrical activity using sensors placed on the scalp. EEGs detect changes in electrical activity within milliseconds – measuring ‘when’- while other equipment (functional magnetic resonance imaging [fMRI], positron emission topography [PET]) measures ‘how’, as changes in blood flow or oxygen increase associated with increased activity in a certain area of the brain are recorded.

The first human EEG recording was conducted by its inventor, Hans Berger, in 1924. Dr. Berger (1873-1941), Professor of Psychiatry at the University of Jena, in Germany, also identified and defined *alpha* and *beta* brain wave patterns. Berger based his theory on the earlier work of researchers including Richard Canton (1842-1926), who theorized the existence of an electrical field around the heads of animals. Although Canton's theory was published in the *British Medical Journal* in 1875<sup>21</sup> Berger was ostracized and ridiculed for his innovative approach to psychiatric research until 1934, when Lord Adrian, an English physiologist, replicated his study.<sup>22</sup>

Initially EEGs were used as diagnostic tests for epilepsy and mental health issues. Graphic printouts looked similar to what today are referred to as 'raw EEG' data. Advances in technology include the evolution of computerized imaging, which offer pictorial representations of brain activity.

Studies have shown that neurons in different areas of the brain fire in response to specific triggers, as well as during performance of physical and mental activities. *Event Related Potentials* (ERPs) or stimuli such as a touch or hearing or seeing a word, create electrical energy peaks (potentials). Thoughts or actions create an *experience* of the event, causing neurons to fire in different areas of the brain. The electrical activity of the neurons invokes the release of neural transmitters. In *Mapping the Mind*, Carter quotes Professor Semir Zeki of University College, London, as stating that his research showed that "the subjective experience could be localized and quantified...at least two dozen other studies have shown the same result for different subjective experiences."<sup>23</sup> Events

which a person experiences create activity in different areas of the brain, according to how they are processed, recorded and interpreted by the person.

Using an EEG, specific oscillation frequencies and amplitudes can be measured and recorded. From this data, overall patterns of brain activity can be determined. This presentation of electrical activity (frequency and amplitude) of the brain is commonly called a *brainwave pattern*. Currently, five brainwave patterns are associated with specific brain activities and states of consciousness. The speed of electrical impulse ranges from 0.5 cycles per second (Hertz or Hz) to over 100 Hz. In order of ascending pulse frequency, these patterns are: delta, theta, alpha, beta, and gamma. Each pattern exhibits variations in both frequency (speed) and amplitude (wave height) which help to identify and categorize them.

*Delta* waves, with a frequency of 0.5-4 Hz, indicate brain waves associated with deep sleep in non-dream time. Yet EEG experts state that by age 10 years, delta waves also comprise less than ten percent of all waking brainwaves.<sup>24</sup>

Some delta is normal in people older than 60 years, at the onset of drowsiness, in response to hyperventilation, and during slow-wave sleep. Excessive generalized delta is abnormal and indicated an encephalopathy that is etiology nonspecific.<sup>25</sup>

Dream activity is marked by *rapid eye movement* or REM. Muscle tone is usually relaxed, except for occasional bursts of activity, as seen in quick jerks or rhythmic movements, where muscles mimic running motions or other movements. Brainwave patterns noted during sleep, but not while dreaming, are called non-REM or NREM.

*Theta* patterns have a frequency of 4-7 Hz and are seen in the frontocentral area of the brain, as a state of relaxed wakefulness occurs. Theta waves are noted in the frontal area when a person is focusing or concentrating, performing mental tasks, or emotionally engaged.<sup>26</sup> Theta activity is enhanced as a person drifts into or out of a sleep state, and with hyperventilation. Subconscious ideas and creative problem solving can rise in this state of consciousness.

*Alpha* patterns, the first to be identified by Berger, have a frequency of 8-12 Hz. They appear when people are awake but relaxed, and when eyes are closed. They are noted to be dominant in the occipital lobe of the brain and can be accompanied by eye blinking, slow eye movements and regular respirations.<sup>27</sup>

*Beta* patterns, with a frequency of 13-30 Hz, dominate when a person is awake and alert, or focused. Beta activity increases with activity, movement and anxiety. This common brainwave pattern usually has lower amplitude (voltage), below 20  $\mu$  V.<sup>28</sup>

*Gamma* patterns have a frequency of 30-70 (or 100) Hz, depending upon the source cited. These high speed brainwave patterns occur with usage of multiple senses.

Brain wave pattern	Frequency (Hertz)	Amplitude	Area of the Brain	State of Consciousness
Delta	0.5 - 4	High	Frontal, Thalamus, Cortex	Deep sleep (2 stages)
Theta	4 - 7	High	Fronto-central	Drowsy, trance, light sleep, meditation
Alpha	8 - 12	High - more on dominant side	Occipital - awake; Central - rest; Anterior - drowsy	Awake, relaxed, resting state, eyes closed
Beta	13 - 30	Low	Frontal - both sides equally	Awake, alert, active, busy, concentrating or anxious
Gamma	30 - 70		Somatosensory, Cortex	Intense concentration

**Table 1. Brainwave Patterns and States of Consciousness of Human Adults.**  
(Multiple sources: Becker, Tatum)

Each pattern is defined by three parameters: the *speed* of neuronal firing, the *amplitude* or height of the electrical ‘burst’ (related to the *number* of neurons firing) and the *phase*. The speed or frequency is measured in *cycles per second* or *Hertz (Hz)*. The amplitude shows the intensity of firing – how many neurons are simultaneously sending electrical impulses. This is measured in *micro volts* ( $\mu\text{V}$ ). The phase relates to positive or negative deflection on the graph.

The brain naturally cycles through all the brainwave states during each twenty-four hour day. When we are awake and alert, beta waves predominate. Every 90 minutes or so, the brain requires a break and slows down its activity to alpha. We may ‘daydream’ or become less alert.

A typical sleep pattern contains several cycles which begin with light sleep and cycle through to ‘rapid-eye-movement or REM sleep. A complete sleep cycle takes 90 to 110 minutes on average. The first period of non-REM sleep is followed by a very short period (10 minutes) of REM sleep which usually occurs about 70 to 90 minutes after we fall asleep. As sleep continues during the night, the periods of non-REM decrease and REM lengthen. The final REM may last up to an hour. Infants can spend up to 50% of their sleep in the REM stage of sleep, whereas adults spend only about 20% in REM.<sup>29</sup>

Although good quality sleep is critical for physiological and mental wellbeing, it consumes only one third of our adult lives. States of consciousness in waking hours also have a huge impact upon our health and wellbeing. Excessive time in beta, due to daily stressors, can be detrimental. Physiological markers of improved health have been noted with the use of biofield therapies including Reiki, Therapeutic Touch and Healing Touch.

Anecdotal information also abounds. However, scientific research including measurement with EEG to correlate states of consciousness during Reiki, Therapeutic Touch and Healing Touch have not been conducted

Limited studies of EEG and acupuncture point to the shift from one state of consciousness to another. Dhond et al. reviewed studies of acupuncture related to pain perception, parasympathetic response, attention, cognition and immune response. They found that “Collectively, neuroimaging studies demonstrate that acupuncture modulates a widely distributed network of brain areas including limbic, prefrontal, and brainstem regions.”<sup>30</sup>

### **Practitioner Expertise**

*“The success of any [randomized clinical trial] RCT is based on having qualified and experienced individuals involved in the study.”<sup>31</sup>*

A number of published studies focusing on various complementary and alternative (CAM) therapies selected ‘experienced’ practitioners to provide interventions to subjects. ‘Experience’ or exposure to similar situations often leads to comfort and expertise in technical skills, self-trust, increased intuition or knowing, as well as creativity in problem solving in high stress or unfamiliar situations. Inclusion of an expert practitioner in research on biofield therapies creates a strong foundation for data collection and furthering scientific outcomes measurements.

The CONSORT (Consolidated Standards of Reporting Trials) Statement is a set of guidelines which was established to improve reporting of randomized controlled trials (RCT). The resulting 22 item checklist was updated to 33 items in 2006, to address non-

pharmacological treatments. It specifically defines appropriate reporting of eligibility criteria for care providers in trials.

Eligibility of care providers might include professional qualifications, years in practice, number of interventions performed, skill as assessed by level of complication when performing the intervention, and specific training before trial initiation. Eligibility criteria should be justified, because they will influence the applicability of the trial results.<sup>32</sup>

Warber et al., agree that the practitioner's qualifications are important and also impact the outcomes, stating that "in energetic healing the practitioner is an integral part of the intervention and usually cannot be separated from the intervention itself."<sup>33</sup> They clarify that the study results will be generalizable to similarly trained practitioners.

Research studies on many forms of complementary modalities have included the use of highly experienced practitioners. Lafreniere, et al., used an 'experienced' Therapeutic Touch practitioner in a study which resulted in significant positive outcomes related to anxiety, mood, and changes in several hormones and neurotransmitters, as compared to the control group, who did not receive any treatment.<sup>34</sup> Rexilius utilized Certified Healing Touch Practitioners and Certified Massage Therapists in her study which compared the effectiveness of these two complementary modalities as they related to reducing anxiety, depression, fatigue, and subjective feelings of burden, among caregivers of cancer patients.<sup>35</sup> Vitale and O'Connor designed their randomized controlled trial of pre- and post-operative Reiki interventions to include registered nurses "who had obtained certification as an expert Reiki practitioner (minimum Level III)."<sup>36</sup> Turner, et al., assessed responses of burn patients to 'sham' Therapeutic Touch (TT) or actual treatments by "experienced TT practitioners, trained in the Krieger-Kuntz method."<sup>37</sup> Wang and Hermann utilized Healing Touch (HT) practitioners "in the

practicum phase of HT certification”.<sup>38</sup> Shah screened four healers to determine which had the greatest efficacy, prior to selecting one for his study of the impact of a healer on tumor cell proliferation.<sup>39</sup> The practitioner he selected had studied Yuanji medicine, a form of Korean healing, for eighteen years. This practitioner also held a Master’s Degree in Engineering. Phase I of Shah’s research was designed to determine more effective healers and exclude less effective ones. He gave prospective healers a plate of cancer cells and let them provide whatever type of healing they practiced. Control and ‘sham’ treated specimens were compared to the treated ones. If two of three attempts showed a practitioner’s treated plate had at least a 15% decreased cancer cell count when compared to the control, they were considered ‘effective’.<sup>40</sup>

Several studies have looked at the differences in outcomes with expert and novice practitioners. As cited by Warber, an unpublished dissertation study conducted by Ferguson found a statistically significant difference in the *quality of practice* of TT practitioners with more than 3 years of regular practice. The difference was noted by both practitioners and recipients. She suggests that if this was replicable, it might set a standard for ‘expert’ TT practitioner, but not necessarily for other modalities.<sup>41</sup> Hayes conducted a qualitative experiment where 33 healthy volunteers received Therapeutic Touch from a ‘novice practitioner’. However, in preparation for the study, this nurse received “21 one-on-one contact hours with an experienced TT practitioner.”<sup>42</sup> This could be seen as a form of mentoring and does not appear to meet Benner’s definition of ‘novice’ (see below). It certainly is much more one-on-one time than a student would receive in a typical two day class with other students.

Other forms of introducing inexperienced practitioners into a study for comparison sake include recruiting untrained people to act as sham practitioners with one group while ‘real’ practitioners offer healing to other study groups. Sometimes ‘sham’ techniques are utilized by true practitioners, who do math problems or try to *not focus healing intentions towards the subject*. Both these types of study have mixed results. (The problem may be more in the study design than with the practitioner’s ability.)

### **Theoretical Nursing Framework**

In the realm of professional nursing, theorists have focused upon experience levels of nurses and their impact upon self-reliance and patient outcomes. Patricia Benner is a nursing theorist who has created a theoretical framework explaining ‘novice to expert’ nursing knowledge, clinical practice and patient outcomes. Benner applied Dreyfus’ *Model of Skill Acquisition*, a model first utilized for pilot training, to define development of nursing knowledge from novice to expert. Her model takes into account the influence of both continuous practical skill development and expanded levels of education, in the journey from novice to expert nurse. Benner outlines five levels of growth along this journey: 1) novice; 2) advanced beginner; 3) competent; 4) proficient; 5) expert.<sup>43</sup> The *novice* stage applies to people with no background or experience, so that clear rules and guidelines are necessary to complete a task. The *advanced beginner* has some knowledge, but relies heavily upon more experienced people for guidance. When a person reaches the stage where they are *competent* they can independently plan and complete tasks. Next, a person becomes *proficient*, as they can see the ‘whole picture’ and adapt to changing situations with confidence and effectiveness. The *expert*, as defined by Dreyfus and Benner, no longer needs rules or guidelines to assess situations

and create or change a plan of care. Intuitive knowledge, combined with general pattern recognition, professional knowledge and awareness of information related to the specific patient, allows for a flow of decision making that is both timely and accurate.<sup>44</sup>

Altman cites Benner's *From Novice to Expert* as "...seminal qualitative research which lays the foundation for understanding nursing expertise and skill acquisition."<sup>45</sup>

Altman further elaborates that experience "...is the learning of exceptions, shades of meaning and individual contexts that are acquired through concrete experiences."<sup>46</sup>

### **"Dose" of Biofield Therapy**

Dosing in randomized controlled trials (RCTs) has been accepted as a part of the 'gold standard' of research. This is due to the fact that RCTs were created to test the safety and efficacy of pharmaceuticals.<sup>47</sup>

Many research studies involving Complementary and Alternative Modalities (CAM) have received criticism for not focusing on specific dosing. Comments and recommendations have also been made by The National Center for Complementary and Alternative Medicine (NCCAM), the CONSORT Group and the National Academy of Science (NAS). In the 2005 NAS *Committee on the Use of Complementary and Alternative Medicine by the American Public*, the committee reported that "In CAM as well as in conventional medicine, randomized controlled trials (RCTs), when possible, are the preferable study design for assessing efficacy."<sup>48</sup> The report also emphasizes the need for practice based research, indicating the researchers must "...probe the many factors that influence individuals to use CAM treatments and that determine the outcomes of those treatments. Research on CAM is inextricably linked to practice."<sup>49</sup> There is a need for a balance of both practice-based and evidence-based research to fill the

knowledge gap related to CAM therapies. Defining and including ‘dosing’ within CAM, and in particular within the study of biofield therapy, can be helpful yet complex.

At first glance, ‘doses’ can be challenging to define, when the area being studied is biofield therapy. Often CAM treatments are used in conjunction with western allopathic medicine. However, clear and accurate planning, treatment, delivery and reporting of dosages are possible. Individual researchers and national recommendations promote standardization and rigor allowing for replication and validation, as well as creating support for larger scale Phase II and III studies. Scientific rigor is enhanced when well designed CAM studies include detailed information on biofield dosing.

As the 2005 NAS paper explains,

Effective studies can be conducted on those aspects of the manualized therapies that can be defined and standardized: one general approach versus another approach, . . . one intensity or duration of treatment versus another. These studies would be examples of what Tunis et al. (2003) call “practical clinical trials.” With some CAM modalities, it may be possible to study the effectiveness of an approach, the school or the intensity of treatment, and the use of a no-treatment or a placebo control as the comparison group. When effectiveness has already been shown relative to the results for the no-treatment controls, studies can be designed to compare more specific features of the general approach or modality. The designs used for these kinds of studies are not necessarily any different from those used for effectiveness studies in conventional medicine. RCTs, as well as studies with less well-controlled prospective or retrospective designs, may be possible.”<sup>50</sup>

The report does caution against breaking ‘bundled’ treatments into pieces – i.e. acupuncture and herbal remedies. “It is difficult, scientifically questionable, and possibly even unethical to restrict for study purposes treatments that would naturally accompany the specific therapy or modality being studied.”<sup>51</sup> Some biofield therapies, such as Healing Touch (HT), are often ‘stand alone’ treatments which are not bundled with other

modalities. Because HT uses standardized curriculum and training, it is also possible to develop research protocols with specific techniques to address particular symptoms. Many of HT techniques have recommended ‘doses’ or duration of time for treatment. Identification of effective doses of biofield therapies like HT can move scientific research forward while gaining an understanding of the complexity of Mind-Body-Spirit (energy) medicine.

NCCAM has written specific guidelines regarding the need for well designed, comprehensive research studies for CAM therapies:

We note that the need for dose-ranging studies prior to Phase III trials applies not only to botanical and other biologically based CAM therapies, but also to other CAM interventions (e.g., mind-body approaches such as behavioral interventions and therapies such as massage, reiki, and acupuncture).<sup>52</sup>

There is a need for practitioners of CAM therapies and scientists open to unbiased appraisals to design and complete CAM research projects based upon scientific rigor. The acceptance of CAM by mainstream healthcare consumers and practitioners has taken time. Increasingly, more CAM studies are using experimental design to examine the efficacy of these modalities. Recognition of the benefits and need for strong scientific research has been an evolving process. Initially CAM practitioners rejected the premise that RCT models should be applied to therapies outside of allopathic medicine. Right brain CAM practitioners have had to develop and hone new skills for research design and analysis.

Vitale notes that recommendations for increased scientific rigor come from within the CAM community, as well as from traditional scientists. She discusses

recommendations from Seer and Carroll that energy field therapies need to have scientifically rigorous studies which focus on ‘timing and duration of interventions...length of use’ as well as practitioners matched for experience, randomization and clearly defined outcomes.<sup>53</sup>

### **Dosing as Part of Scientific Rigor**

The National Institute of Health (NIH) published an on-line document entitled *Guidance on Designing Clinical Trials of CAM Therapies: Determining Dose Ranges* in December of 2003. This document articulates the need for establishing firm dosing within each study, so that replication is possible.

For some CAM interventions and clinical conditions, substantial previous research may exist that has determined the optimum dose for a treatment. For others, dose-ranging studies will need to be performed prior to beginning more expensive Phase III studies. Therefore, if the scientific literature does not contain scientifically valid dose-ranging data, the investigator should consider collecting these data.<sup>54</sup>

Warber agrees, and notes that within many CAM studies “there are many arbitrary decisions made about dose duration, frequency and intervals between doses.”<sup>55</sup> The discussion continues to address the lack of systematic examination of dosing to determine if a small dose has a different impact than a larger dose, highlighting the fact that in “conventional medicine, observation of a dose effect is one way to show that a specific action is taking place.”<sup>56</sup>

NCCAM guidelines also address efficacy as it relates to a minimal usage required for change in health, mentation, and well-being:

...the investigator needs to know the optimum number, frequency, and length of sessions needed to achieve efficacy while minimizing negative consequences, such as poor recruitment rates or patient noncompliance with the treatment regimen.

Designing protocols and reporting findings with accurate dosing is needed for study replication. Warber cites a variety of studies evaluating Therapeutic Touch where the dose (time) lasted from 3 to 30 minutes.<sup>57</sup> Lafreniere et al., conducted research on the efficacy of Therapeutic Touch (TT) related to changes in mood of 41 healthy female volunteers. Subjects were randomized into control and experimental groups (EG), three sessions were given to EG, and the procedure was described in several steps including ‘directing and modulating energy’. The descriptive vagueness continues by noting that the sessions were stopped ‘when the energy was restored’, which may be appropriate clinically, but is not clearly defined in this study. Subjects rested for ‘5 to 10 minutes’ after receiving the TT treatment. The duration of treatment and ‘dose’ are not defined, making replication impossible.<sup>58</sup>

Turner conducted a single-blinded RCT of sham versus TT. Subjects received daily sessions for five days, with TT subjects having significantly greater pain reduction. Treatment length varied from 5-20 minutes, with resting time of 5-10 minutes. Times were determined by ‘practitioner’s subjective judgment’.<sup>59</sup> This subjectivity may be applicable in practice-based research studies of this particular modality, but the lack of standardized protocol (or application of it) might weaken the design of a CAM RCT.

In an interesting single case study of surface electromyogram (EMG), measured muscle activity during a Healing Touch session, Forbes et al., describe

their protocol in great detail, yet fail to mention a dose or the duration of the therapeutic portion of the session.<sup>60</sup>

There are also complete, well designed studies on CAM modalities which meet the requirements for rigor. Mackey conducted a study on the effects of Reiki where subjects received a 30 minutes ‘dose’.<sup>61</sup> Wang studied the effects of Healing Touch therapy for patients with dementia. Agitation levels were measured using the Cohen-Mansfield Agitation Inventory and a ‘dose’ of 10 minutes of HT was offered once a week for four weeks. A significant decrease in agitation was noted for the experimental group.

Agreement on the appropriate number and length of time (dose) may be challenging to determine. However, when researchers clearly articulate study protocol, standardize treatments, and state the duration and dose of treatment, replication is possible. Researchers may select a ‘best practice’ dose for pilot studies and then compare two or more doses in later studies. Assuming all other requirements of sound study design are met, when a dose is determined and reported, analysis of effectiveness can be determined. Studies can be planned and conducted “in several phases, increasing length of treatment, frequency of treatment, or both, in repeated trials. This approach may help to maximize the effects observed in future studies.”<sup>62</sup>

Some esoteric points need to be made at this time. Dusek and Sherwood point out a logical and interesting relationship between experienced intercessory practitioners and dose: “If the quality of ... providers can be established by

selecting experienced, committed professional[s]...the notion of dose may not be inconceivable.”<sup>63</sup> This seems to imply that if the practitioner expertise is more standardized, there may be one less variable in the formula. Perhaps the expert does things in a ‘usual’ way, falling into a sort of pattern, which may impact the ‘dose’ of prayer or healing facilitated by the practitioner.

Randomized Controlled Trials (RCTs) are one of the ways by which traditional and CAM therapies can be measured and validated. According to this design, defining a specific dose of any therapy or medication is critical to assessing effectiveness. It is also possible that a variety of ‘doses’ are equally effective in biofield therapy. Well designed and implemented research studies may demonstrate this fact. Several Healing Touch techniques lend themselves to this type of study and a ‘dose’ can be assigned and studied, to begin to fill the gap in knowledge in this area of research.

## **Healing Touch Research**

Students and practitioners around the world relate thousands of anecdotal reports of decreased stress and anxiety, decreased pain, enhanced well-being and other benefits of mind, body and spirit for recipients of Healing Touch. Research related to Healing Touch includes systematic reviews, empirical research, and case studies. Qualitative, quantitative and mixed methods studies have been conducted in the past 20 years. Subjects have included males and females, college students, nurses, cancer patients, post-surgical patients, and people with dementia. The quality and depth of research varies widely, but has grown stronger over the years. Healing Touch research has been supported and/or funded by hospitals,

universities, colleges, professional organizations, private foundations, and the National Institutes of Health Center for Complementary and Alternative Medicine (NCCAM).

As noted previously, NCCAM uses the phrase ‘biofield therapy’ to refer to hands-on-healing modalities which include Healing Touch.<sup>64</sup> “Although biofield therapies are among the most ancient of healing practices, scientific quantification of the methods, mechanisms, safety, and effectiveness of these therapies is limited.”<sup>65</sup> Today NIH, most researchers and biofield practitioners agree that science has not developed equipment or methods sensitive enough to accurately measure the actual mechanism of this type of healing. Kemper notes that “most therapists who provide TT or HT believe the mechanism for clinical effects involves a subtle energy, vibration field, non-linear electromagnetic energy, or spirit or vital force.”<sup>66</sup>

### **Systematic Review**

In a systematic review funded by NCCAM, Anderson and Taylor reviewed the literature and found 332 studies involving Healing Touch. Their elimination criteria included studies without randomization or control groups (usual care or mock HT), those that used healthy subjects, those using HT as ‘part of a complex intervention’ (not pure HT), or studies with methodology which did not contain measured outcomes. Eight RCTs were eliminated because they were completed but not published at the time of the review. Only five studies met their review criteria. Of the five RCTs reviewed, four used parallel group design and one had a crossover design. The first study, by Post-White, compared HT and massage for improvement in cancer symptoms in 230 subjects. Analysis “showed a significant decrease in respiratory rate, heart rate, blood pressure, current pain, total

mood disturbance, and fatigue... following the Healing Touch intervention.”<sup>67</sup> Seskevich et al. found ‘a significant decrease in the level of worry and a significant increase in reported feelings of satisfaction.’<sup>68</sup> MacIntyre et al. found that first time, non-emergent coronary bypass patients “...in the Healing Touch group had significantly decreased length of stay and decreased anxiety levels, when compared with a group receiving visitation or usual care alone.”<sup>69</sup> The Cook study of women receiving radiation therapy for cervical or breast cancers focused on quality of life indicators. It showed a ‘significant increase in overall functional score, emotional role functioning, mental health, and health transition in the Healing Touch group.’<sup>70</sup>

Anderson and Taylor set criteria which eliminated 98.5 % of published studies from their review. Many of these studies used reliable, validated tools such as the State Trait Anxiety Inventory (STAI) to measure changes in short term and long term stress. Biomarker measurement included immunoglobulin A (IgA), natural killer cells (NK), and other blood tests. Physiological metrics of blood pressure, heart rate, respiratory rate, oxygen saturation, or skin conductivity validated shifts from sympathetic to parasympathetic states, indicating the presence of the relaxation response. Since it is likely that many of these studies had some merit, several of them will be discussed here. Cook et al. (above) were not the only researchers who found that cancer patients seem to benefit from Healing Touch sessions. Lutgendorf et al. explored the impact of HT on women receiving chemo radiation for cervical cancer in a prospective randomized clinical trial. They measured Natural Killer cell activity and chemotherapy toxicity, mood and quality of life indicators, as well as white and red-cell counts. Of 237 potential subjects, 60 were included and randomized into HT, relaxation therapy (RT), or usual

care (UC) groups for the study. NK cells declined sharply in the RT and UC groups, while the HT group had a ‘minimal decrease’. HT subjects showed greater decreases in two depression indicators.<sup>71</sup> Hart et al. expand on the impact of this study as it relates to *The Use of Healing Touch in Integrative Oncology*,<sup>72</sup> stating that ‘biofield therapies may induce the relaxation response, which results in blunting of the neuroendocrine stress response’.<sup>73</sup> The authors suggest that biofield therapies combined with supportive caregivers and the creation of hope may enhance the relaxation response.

Biological correlates of stress and the relaxation response have been the focus of other studies involving Healing Touch. Maville et al. collected and reported comprehensive data on methodology, protocol and physiological changes of 30 subjects receiving HT sessions of 30 minutes (using HT techniques of ‘hands in motion’ and ‘Chakra Connection’). Pre and post-intervention measures included the STAI and blood pressure. Continuous monitoring of heart rate, skin temperature, skin conductivity and muscle activity were recorded. These investigators found that the data “show changes in a number of physiological measures that are consistent with a greater state of relaxation, and also show a corresponding decrease in psychological anxiety”.<sup>74</sup>

Dowd et al. compared the effects of Healing Touch, coaching and a combination of both interventions with a group of undergraduate college students who were compared with a wait listed control group. This study found that the immediate impact upon stress and comfort was best with the HT (Mind Clearing) intervention, while longer-term results for stress reduction and comfort were seen with coaching.<sup>75</sup>

Tang et al. evaluated the effect of stress levels of twenty-four nurse leaders who participated in a Healing Touch Level 1 class. This quasi-experimental single group pre-

test post-test study showed significant improvement in ‘subjective and objective measures of stress.’<sup>76</sup> Measures included heart rate variability (HRV) which demonstrated significant changes consistent with decreased stress and enhanced well-being; significant decreases in self-reported stress, depression and anxiety; significant improvements in relaxation, well-being and sleep.<sup>77</sup>

A mixed method, repeated measures design study was conducted by Wilkinson et al. and published in 2002.<sup>78</sup> Salivary IgA, self-reported stress levels, qualitative questionnaires and client perceptions were measured for a control group, HT group and HT plus music group. Increased salivary IgA indicated enhanced immune function. In the HT group, pain relief, perceptions of stress reduction and increase in IgA were all supported by study results.

A study measuring agitation reduction in a sample of convenience of 14 patients with dementia showed decreased agitation on the Cohen-Mansfield Agitation Inventory.<sup>79</sup> The intervention was a ten minute Healing Touch session offered once a week for four weeks.

## **CHAPTER 3: RESEARCH METHODS**

This chapter discusses the methodology used in this research study. It includes the study design, recruiting techniques, screening procedures, subject demographic information, inclusion and exclusion criteria, confidentiality protocol, and methods of data analysis.

### **Study Design**

This study utilized a mixed methods, randomized, controlled, subject-blinded experimental design to evaluate the changes in brainwave patterns and physiological markers with or without a 20-minute “dose” of healing touch, standardized as a Chakra Connection (1on 1) technique.

The design is diagrammed as follows:

R	O <sub>1</sub>	X	O <sub>2</sub>
R	O <sub>1</sub>		O <sub>2</sub>

**Table 2. Diagram of Research Design**

(Where R = randomized; O = Observation; X = intervention.)

### **Subjects**

All participants in this study were volunteers who self-reported data and perceptions. A control group and one intervention group were studied.

## **Recruitment**

In order to recruit both males and females, and subjects of various ages, subjects were recruited from the student populations of South College, in Asheville, North Carolina; Asheville Ballroom (young adults, middle aged and retired adults); local health-food stores; and general food stores. Recruitment was accomplished by distributing fliers (Appendix A) and by invitation from the investigator.

Subjects contacted the Principal Investigator (PI) via a dedicated e-mail address or phone number. When a potential subject expressed interest the PI responded using the *First contact e-mail or phone script* (Appendix B and C), and obtained the potential subject's age and gender to randomize subjects within one of three age brackets: 18-32 years, 33-47 or 48 years and older. These three age groupings were defined to separate subjects into Generation Y, Generation X and Baby Boomer age groups, to determine if age was an independent variable related to changes. Once subjects were grouped by age and gender they were randomized using an independent random number generator for each of the six strata (Appendix D). Subjects were blinded regarding the outcome of their randomization.

## **Exclusion Criteria**

Subjects less than 18 years of age; those unable to read the English language; those requiring oxygen (not recommended with use of biofeedback equipment)

## **Inclusion Criteria**

Age greater than 18 years of age; able to read the English language; able to lie on massage table comfortably for 30 minutes; 'healthy' subjects and those with health

issues, which were identified at the time of the initial survey, prior to treatment.

(Biofeedback is not contraindicated for most health issues.)

### **Discontinuation Criteria for Subjects**

- 1) Participant request (at any time during data collection)
- 2) Treatment related distress or discomfort which cannot be resolved.

If the PI believed that continuing with the process would not be helpful to the participant, the session would be discontinued.

3) If a participant had withdrawn or was discontinued from the study before its completion, the date of withdrawal and reason would have been recorded and reported to the IRB.

### **Randomization**

Subjects who consented to participate were stratified by age and gender, and then randomly assigned to either the control group (CG) or the intervention group (IG).

### **Human Subject Considerations**

The study was approved for Expedited Review by the HUGS IRB. The PI had previously completed training related to protection of human subjects (Appendix E - CITI certificate).

The following statement of confidentiality was included as part of the informed consent form: “The information that you provide in questionnaires will be kept confidential. Only the researcher will have access to the data collected in this study which will not contain your name or other identifying information. Your anonymous comments and evaluation at the end of the session may be used in a research paper.”

Informed consents did not have participants' names on them. They were kept in a locked file. All information on the pre- and post surveys was de-identified. Data within BioGraph Infiniti database did not include names or identifiable information.

### **Potential Risks/Safety**

There were no anticipated risks or harm to participants. The equipment used was the BioGraph Infiniti biofeedback equipment which has been in use since the 1970s and is routinely used in the University of North Carolina - Asheville Biofeedback Lab, as well as many private clinical practices around the world. Non-invasive fiber-optic sensors were secured to the skin (fingers, earlobes and one scalp placement) to record data. No electricity was conducted into the body.

### **Subject Demographics**

The Principal Investigator received 75 responses to the flyers and personal invitations to participate. Seventy people made appointments for the study. One man did not come for his appointment and was not able to reschedule within the time period of the study. There were recording issues with a 93 year old subject, so he was given a complimentary HT session, without measurement recording. A total of 68 participants were included in the study, with 61 counted in the analysis. Four control and four intervention participants were eliminated. One male was excluded because he could only recline in a side lying position and all others were supine. Two females and one male had excessive movement creating excessive artifacts which needed to be filtered out. One female blinked continuously. One male had a tracing which showed electrical interference throughout the session (60 Hz). This interference could not be identified and eliminated. One subject had loud external noises during the recording .

## Subject Age

Subject ages ranged from 18 to 91 years old, with a fairly even distribution among the three age categories: 18-32 years (31.1%); 33-47 years (31.1%); 48+ years (37.7%).

## Ethnicity

The majority (88.7%) of participants were Caucasian. The other eleven and one half percent were of African American, American Indian, Hispanic, or bi-racial descent. Randomization into intervention and control resulted in even numbers (n=27) of Caucasians and nearly identical numbers for the non-Caucasian group (n=4 for treatment and n=3 for control).

## Gender

Females (n=34 or 55.7%) slightly outnumbered males (n=27 or 44.3%). An equal number of females were in the control and intervention groups (n=17), while males accounted for 14 in the treatment group and 13 in the control group.

	Treatment Group		Control Group		Total study	
	N=31	%*	N=30	%*	N=61	%*
Age (median in years)	40	(18-91)	38	(20-72)	40	(18-91)
Age categories						
18-32	9	29.0	10	33.3	19	31.1
33-47	9	29.0	10	33.3	19	31.1
≥ 48	13	41.9	10	33.3	23	37.7
Race/ethnicity						
Caucasian	27	87.1	27	90.0	54	88.5
Other†	4	12.9	3	10.0	7	11.5
Gender						
Female	17	54.8	17	56.7	34	55.7
Male	14	45.2	13	43.3	27	44.3

\* May not add to 100 due to rounding.

† Other includes African American, American Indian, Hispanic, and bi-racial.

**Table 3. Demographics**

## Health Issues

Eleven (35.5%) of the intervention group denied having any serious health issues - fourteen cited having one health issue, with five of those being vision (contacts, glasses, and other issues), while six (19.4%) noted two or more health current issues. In the control group, seventeen (56.6%) denied any health issues, with eight (26.7%) noting one health problem (2 vision) and five (16.7%) detailing two or more current health issues.

	Treatment Group		Control Group		Total study	
	N=31	%	N=30	%	N=61	%
Blood Pressure	6	19.4	2	6.7	8	13.1
Cholesterol	1	3.2	4	13.3	5	8.2
Vision	5	16.1	5	16.7	10	16.4
Weight	5	16.1	4	13.3	9	14.8
Other*	9	29.0	6	20.0	15	24.6

\*Other includes diabetes, depression, pulmonary, cancer, lung, and digestive issues.

**Table 4. Health Issues**

## Prior Experience with Energy Modalities or Massage

Only one person (3.2%) in the intervention group had no prior experience with any energy modality or massage. Twenty-eight (90%) had experienced massage in the past, while eleven (35.5%) had experienced one form of energy work and six (19.4%) had experienced two modalities. Thirteen (41.9%) had experienced three or more forms of energy work or massage.

In the control group, four subjects (13.3%) had no prior experience with any energy modality nor massage. Twenty-five (83.3%) had experienced massage in the past, while eight (26.7%) had experienced one form of energy work and eight (26.7%) others

had experienced two modalities. Ten subjects (33.3%) had experienced at least three forms of energy work or massage.

	Treatment Group		Control Group		Total study	
	N=31	%	N=30	%	N=61	%
Previously experienced						
Reiki	15	48.4	11	36.7	26	45.6
Therapeutic Touch	9	29.0	7	23.3	16	26.2
Healing Touch	12	38.7	15	50.0	27	44.3
Energy work	12	38.7	8	26.7	20	32.8
Massage	28	90.3	25	83.3	53	86.9

**Table 5. Previous Therapy Experience**

### **Participant Expectations**

The participants were asked to rate their expectations of the 'relaxation' session pre-treatment and then rate their actual experience post-treatment. No one from either group anticipated a negative experience. Although both groups were blinded to their status, twenty-five (80.6%) of the treatment group expected a positive outcome, while seventeen (56.7%) control subjects expected a positive outcome. Six (19.4%) intervention participants had 'neutral' expectations, while thirteen (43.3%) of the control group had 'neutral' expectations.

Actual outcomes showed 100% positive outcomes for the intervention group (n=31) and 83.3% positive (n=25) experience for the control group, with 16.7% (n=5) having a 'neutral' experience.

## Anxiety and Pain

Twenty-two (71.0%) of the intervention group had some stress while nineteen (63.3%) of the control group reported stress. Thirteen (41.9%) of the intervention group reported pain prior to the session, while eleven (36.7%) reported pain at that time.

	Treatment group		Control group		Total study	
	N=31	%	N=30	%	N=61	%
Expectation						
Positive	25	80.6	17	56.7	42	68.9
Neutral	6	19.4	13	43.3	19	31.1
Negative	0	0	0	0	0	0
Experience						
Positive	31	100	25	83.3	56	91.8
Neutral	0	0	5	16.7	5	8.2
Negative	0	0	0	0	0	0
Pre-treatment anxiety						
Yes	22	71.0	19	63.3	41	67.2
No	9	29.0	11	36.7	20	32.8
Post-treatment anxiety						
Yes	13	41.9	11	36.7	24	39.3
No	18	58.1	19	63.3	37	60.7
Pre-treatment pain						
Yes	13	41.9	6	20.0	19	31.1
No	18	58.1	24	80.0	42	68.9
Post-treatment pain						
Yes	8	25.8	4	13.3	12	19.7
No	23	74.2	26	86.7	49	80.3

**Table 6. Pre-Treatment and Post-Treatment Self-Ratings**

## Practitioner Qualifications

The practitioner, who was not the PI, is a registered nurse who has been a Healing Touch Certified Practitioner since 1993. She works as an integrative healthcare nurse and offers Healing Touch and other integrative modalities to patients in a 600-bed acute care facility, three to five days per week.

## Setting & Equipment

### Setting

The protocol and setting took place in a healthcare suite within a professional building, which was not sound-proofed. A decibel meter was used to measure baseline noise level in the room, with an average range of 44-46 decibels noted, which is the recommended range for daytime healthcare setting. Additionally, noise reducing headphones (up to 87%) were utilized to decrease extraneous loud sounds.

Furnishings included a small table and two chairs to provide an area for discussion with the participants; a desk with a computer and chair for the PI; and a padded massage table. Artwork, plants and soft lighting completed the scene. No music was played. The room was quiet and the practitioner was silent once the participant had a brief introduction to her and all equipment was applied. The only people in the room for each session were the practitioner (IG only), the PI and the subject.

### Equipment

The BioGraph *Infiniti 5.1* system is composed of hardware and software manufactured by Thought Technology LTD., of Quebec, Canada. This company has been manufacturing and selling biofeedback equipment since 1973, according to company information. The ISO certificate number for this equipment is 9003-8.

The BioGraph *Infiniti* software program was modified by the PI and Thought Technology consultant to incorporate information from several screens onto one (See Figure 9). The information included: raw EEG display, a 2-D histogram display of frequency band distribution, a Compressed Spectral Array (CSA) which was a cascading 3-D graphic display of frequency band distribution, and digital readouts for temperature,

heart rate, respiratory rate and skin conductivity. Measures of Delta, Theta, Thalpha, LoAlpha, Alpha, Beta, and Theta/Beta ratio were also displayed.

The hardware and software included the following items:

- 1) Encoder Pro Com Infiniti with BioGraph *Infiniti* (EEG Suite) Software Model (Model SA 7500); version 5.1.1; copyright 2003-2010
- 2) Hardware: TT-EEG-Z impedance checking sensor with monopolar/bipolar kit with DIN cable (Model T9305Z); Blood volume and pulse (BVP) sensor (Flex Pro L8330); Respiratory sensor (Flex Pro SA9311M); Temperature sensor (Flex Pro SA9310M); skin conductance sensor (SC Flex Pro M9194 SA)
- 3) Accessories: NuPrep Skin Prepping Gel; Ten-20 Conductive Paste.

## **Protocol**

After potential subjects contacted the PI, gave verbal consent and were randomized as noted above, appointments were scheduled and directions to the research site were given to each subject. A reminder e-mail or phone call was initiated two days prior to the set appointment. Each of the participants was seen individually. Each was greeted by the PI, the protocol was discussed and the informed consent (Appendix F) was signed. The term “Healing Touch” was not used in the discussion prior to randomization – rather, ‘relaxation’ was used as a general term. The intervention group had a brief explanation of Healing Touch during the consent and pre-intervention data collection. The pre-intervention survey (Appendix G) was completed by each participant to gain demographic information, assess health history, determine previous experience with Healing Touch or other biofield therapies, and record expectations of the session. Participants were invited to remove shoes and glasses. Then the respiration belt was applied over one layer of clothing. Next, each participant was assisted to lie down on their backs, fully clothed, upon a padded massage table. Pillows were placed under the

knees and the head for good body alignment and EEG sensor placement. A light blanket was offered for comfort.

If a participant was in the control group, and completed the CG process, they were offered a complementary 30 minute Healing Touch session after all study data collection had been completed. For the IG, the intervention was a Healing Touch technique called the Chakra Connection, which is described verbally and with illustrations in the Level 1 Healing Touch Notebook (Appendix H). A treatment dose of 20 minutes was utilized. This consisted of 1 minute of attunement with the subject and 19 minutes of energy balancing. The purpose of this technique was to open, connect and balance the energy of the seven major chakras (energy centers) and minor chakras in the extremities. The Chakra Connection (1 on 1) was performed by the Healing Touch Certified Practitioner described above in the section “Practitioner Qualifications”.

A single channel referential (monopolar) montage was used, with the active sensor at PZ on the scalp, the ground sensor was clipped to the right earlobe and the reference sensor was clipped to the left earlobe. Equipment application was completed by the PI, in the following sequence, which follows recommendations of Thought Technology LTD.

- 1) After the *BioGraph* database was opened, cable configuration was double checked by PI
- 2) Cables were connected to the eight channel encoder according to the configuration
- 3) The respiration belt was applied over the subject's clothing and checked for proper recording of respirations
- 4) The BVP probe was attached to the middle finger of the right hand by a Velcro strap
- 5) The skin conductivity sensors (two parts) were attached to the index and ring finger of the right hand by Velcro straps

- 6) The temperature sensor was attached to the middle finger of the left hand with tape
- 7) The PI cleansed the anterior and posterior earlobes and the (EEG) PZ point on the top of the head with NuPrep Skin Prepping Gel
- 8) Ten-20 Conductive Paste was applied to the EEG cable conductive surfaces which were attached to the earlobes and scalp (at PZ point on the top of the head)
- 9) Sony noise reducing headphones (model MDR#NC7) were used to decrease potential noise in the professional suite
- 10) Impedance check was completed after placing sensors and headphones on subject
- 11) A baseline EEG recording was conducted for 4 minutes – 2 minutes with eyes closed (alpha brainwaves expected to be dominant) and 2 minutes with eyes open (alpha is normally blocked with eyes open)
- 12) IG Subjects: Lying supine on massage table, fully clothed, with pillow under knees and head for optimal comfort, body alignment and clear area around PZ point on scalp; IG received a 20 minute Healing Touch Chakra Connection, where the certified healing touch practitioner held each hand position for one minute (as described above); then a 4 minute post-intervention recording was taken (2 minutes with eyes closed followed by 2 minutes with eyes open)
- 13) CG Subject; Lying supine on massage table, fully clothed, with pillow under knees and head for optimal comfort, body alignment and clear area around PZ point on scalp; CG relaxed silently for 20 minutes with eyes closed; then a 4 minute post-intervention recording was taken (2 minutes with eyes closed followed by 2 minutes with eyes open)
- 14) Equipment was removed by PI and subject was assisted to sit up
- 15) PI cleansed the conductive paste from subject skin and scalp (tissue and alcohol)
- 16) PI cleansed all cables with alcohol and inspected equipment between subjects
- 17) At the end of the session all participants completed a post-treatment survey (Appendix I)
- 18) CG subjects received a gift certificate for a 30 minute Healing Touch session (Appendix J)

### **Attrition**

Attrition was expected to be low due to minimal subject time and involvement: one contact to answer questions and set the appointment, and only one 45 minute session for the study. Participants provided their own transportation to and from the study setting. Only one participant who agreed to participate failed to appear for the appointment. He

could not re-schedule. No one declined treatment or withdrew from the study during data collection.

### **Database Filtering**

The individual session recordings were reviewed and artifacts were filtered according to Thought Technology recommendations, prior to statistical calculations. Seven sessions were excluded due to high percentage of artifacts - subject movement and electrical anomalies. The following guidelines were used to determine if a session should be disqualified, based upon percentage of artifact removed by filtering:

- during eyes open (EO) baseline and post-baseline 15-40% acceptable
- during eyes closed (EC) baseline and post-baseline 5-40% acceptable
- during the intervention or 20 minute relaxation period below 40% acceptable

### **Statistical Analysis**

Descriptive analysis was used to compare demographic factors and previous therapy experience in the control and intervention groups. Pre-and post-test differences in self-assessed anxiety and pain were compared between groups using linear regression, controlling for variables of age, gender and previous therapy experience. Comparative changes in EEG for control and intervention group were visualized graphically, assessing mean values and 95% confidence intervals.

## **CHAPTER 4: RESEARCH FINDINGS**

*It is not to see something first, but to establish solid connections between the previously known and the hitherto unknown that constitutes the essence of scientific discovery.*

- Hans Selye

This chapter contains the research findings of the study. As stated in Chapter 1, the study reported here examined in detail changes in brainwave patterns and physiological markers of randomized control and intervention groups, where the intervention was a twenty minute Healing Touch session. Self-reported changes in anxiety and pain were also submitted and analyzed.

Descriptive analysis was used to compare demographic factors and previous therapy experience in the control and intervention groups. Changes in anxiety/stress and pain were assessed with linear regression models assessing median change in self-rated stress and pain levels pre- and post-sessions. Variables included prior experience with Healing Touch; prior experience with Therapeutic Touch; prior experience with Reiki; prior experience with other energy modalities; prior experience with massage; gender and race. Linear regression and quadratic analysis were used for correlations of age.

This chapter is organized to assess the three hypotheses stated in Chapter 1.

### **Descriptive Analysis**

Sixty-eight participants completed the study. Seven recordings and data sets were excluded from statistical analysis. The final analysis was conducted on thirty-four females and twenty-seven males. There were seventeen females in both the intervention

and control groups. Fourteen males were in the intervention group and thirteen males were in the control group. Age ranges were from 18-91 years, with the median age being 40 years. Nearly ninety percent (88.5%) of the participants reported being of Caucasian descent.

Statistical analyses compared control and intervention groups descriptively, in addition to pre-and post-test differences in temperature, respiratory rate, heart rate and skin conductivity. Comparative changes in EEG for control and intervention group were assessed through t-test analysis and multivariate linear regression, controlling for variables of age, gender and previous experience with energy healing.

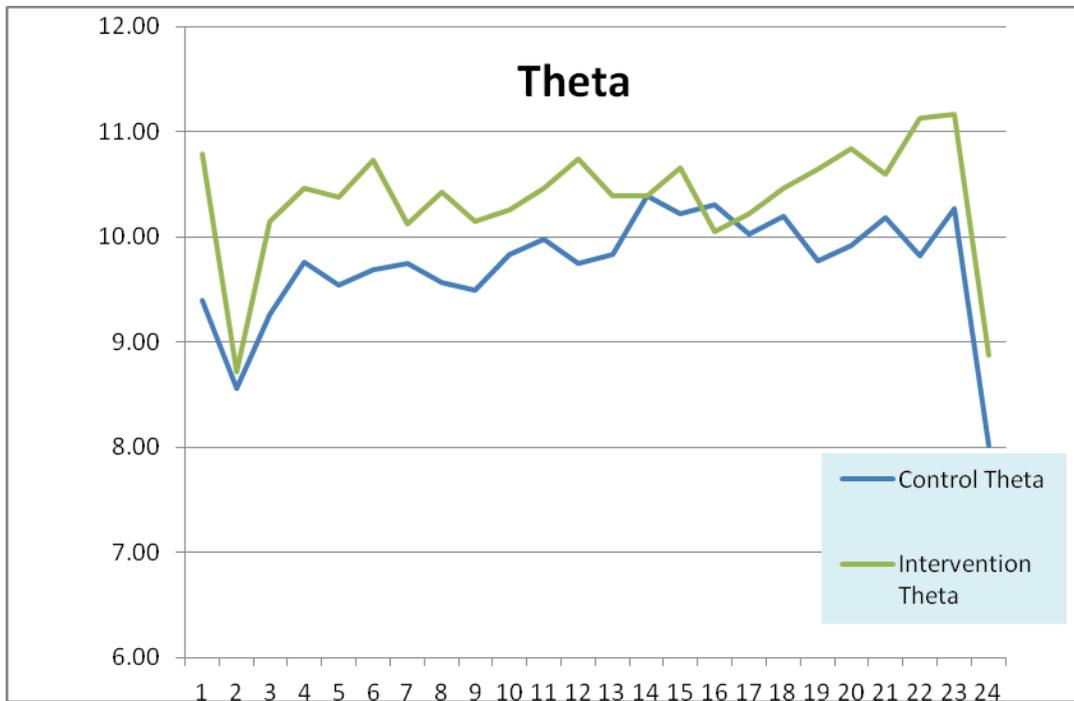
### **Hypothesis 1**

*Research results will demonstrate a relationship between changes in brainwave patterns and receipt of Healing Touch session.*

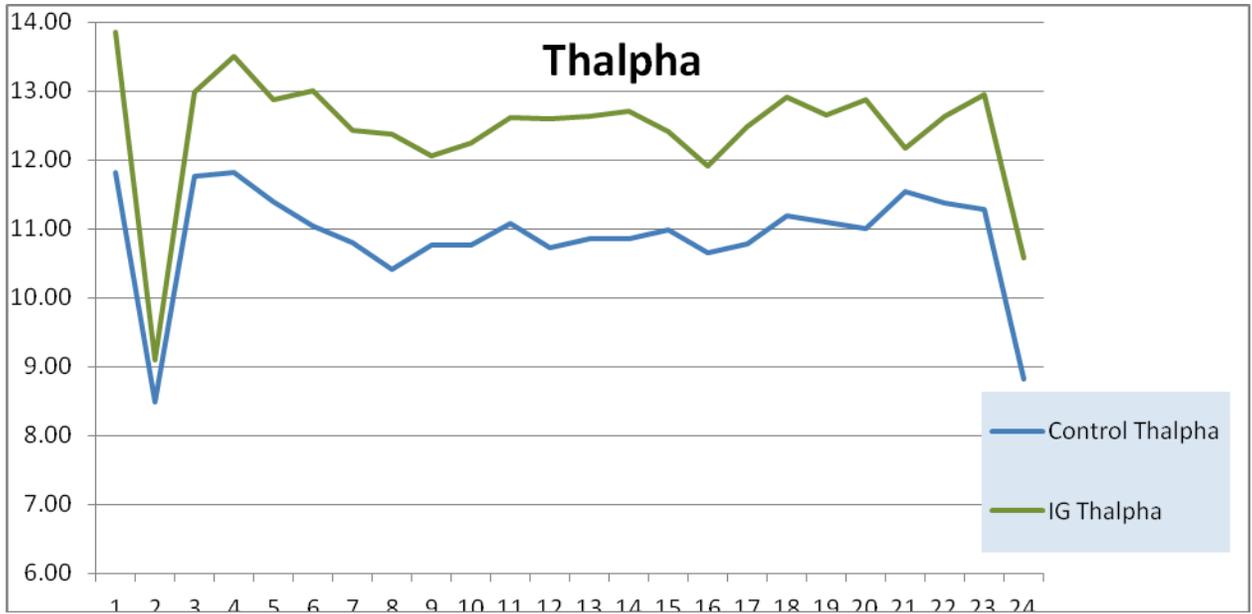
Normally, as one moves into a more relaxed state, the brainwave activity shifts away from beta dominance, into high alpha, low alpha, theta and then into delta, as we fall asleep. One would expect to see this movement from beta dominance to lower bandwidths or frequencies, as relaxation increases.

Figures 1 through 4 show the array of brainwaves for Control and Intervention groups, respectively. Interestingly, there is more neuronal activity in each of the brainwave patterns (bandwidths or Hz) for the intervention group. The amplitude in bandwidths is consistently higher, although the difference is not statistically significant at a confidence level of 95%.

The intervention group has a consistently higher amplitude in Theta (4-7 Hz), Thalpa (6-10 Hz) and Low Alpha (8-10 Hz) as compared to the control group. High Alpha (11-12 Hz) levels also remain slightly elevated for the intervention group (See Figure 4). This is an unusual finding.

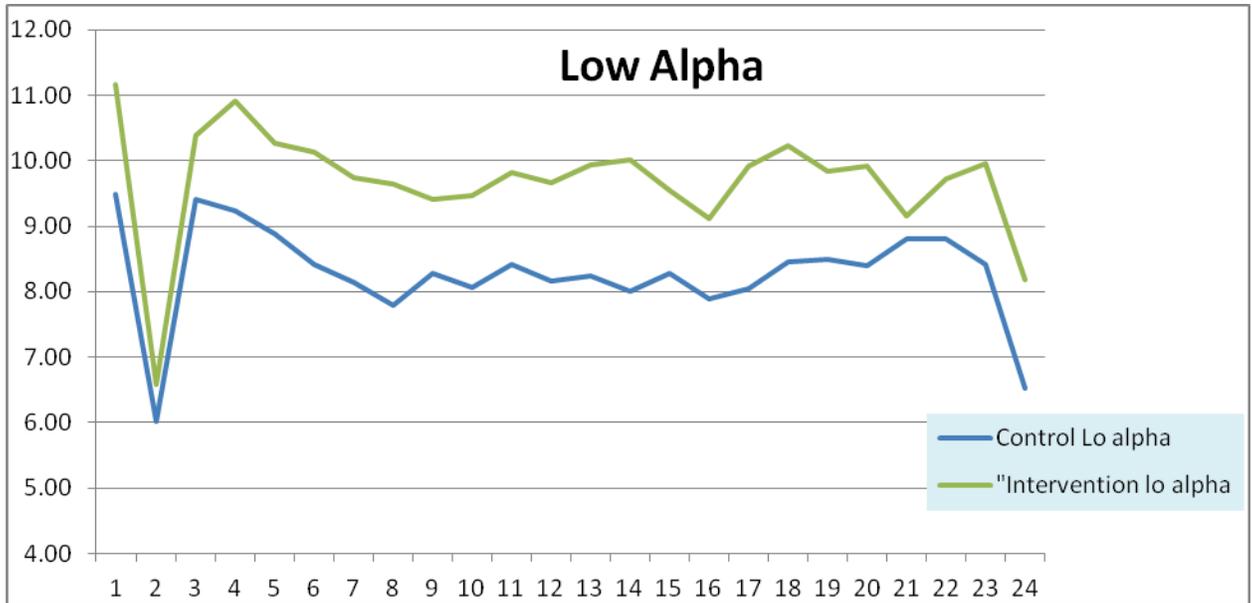


**Figure 1. Control versus Intervention Group - Changes in Theta**



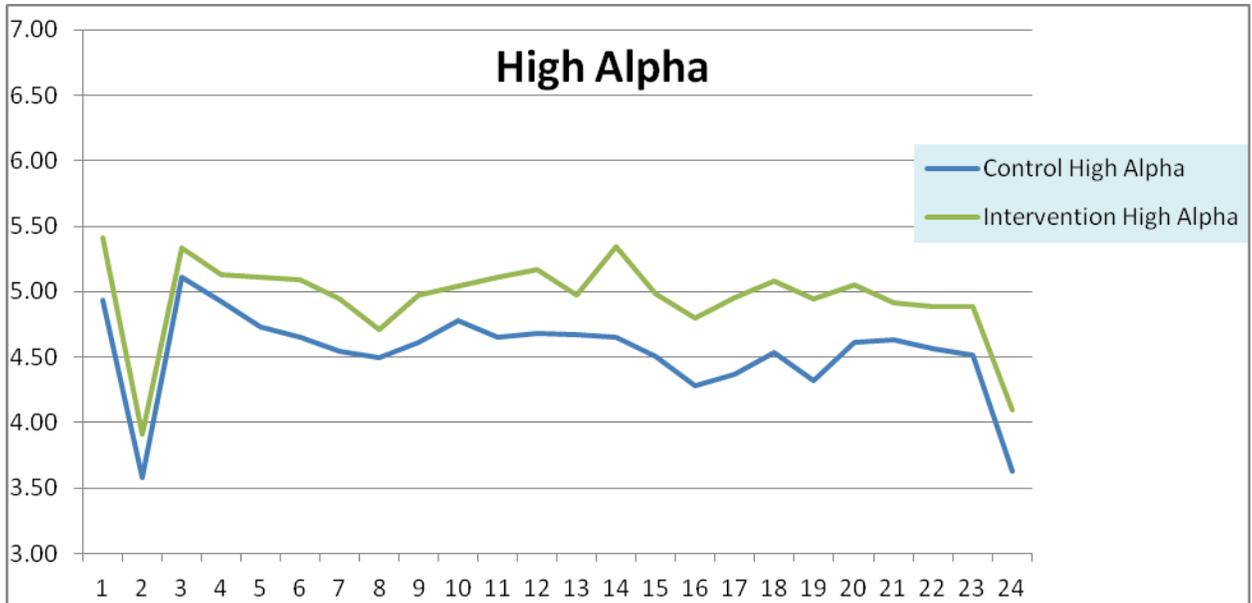
**Figure 2. Control versus Intervention Group - Changes in Thalpa**

Thalpa represents a deep relaxation rather than a particular focus in one area or activity of awareness. The intervention group trend is 1-1.5 micro volts ( $\mu\text{V}$ ) higher than the control group.



**Figure 3. Control versus Intervention Group - Changes in Low Alpha**

Low alpha represents a general awareness rather than a particular focus in one area or activity of awareness. The intervention group trend is 1 microvolt ( $\mu\text{V}$ ) higher than the control group.



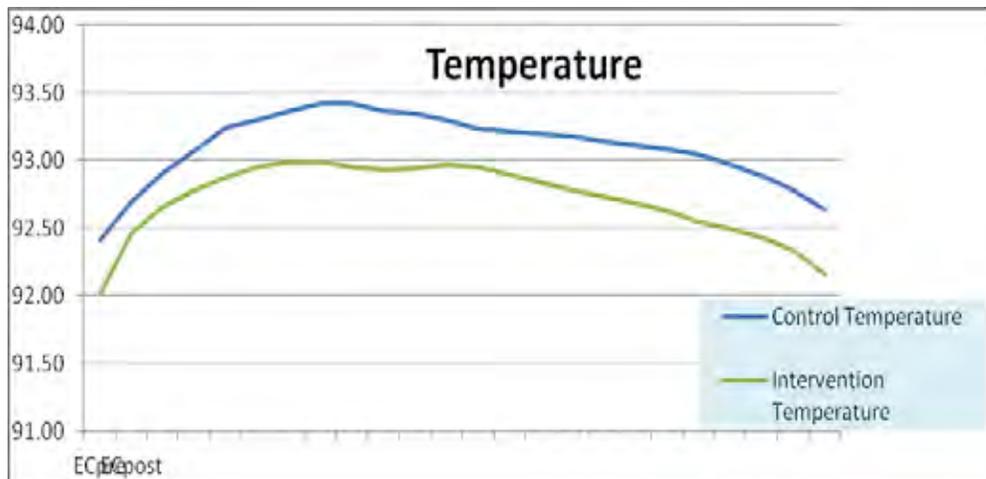
**Figure 4. Control versus Intervention Group - Changes in High Alpha**

High alpha represents a relaxed but awake state of consciousness where more cognition or focus is seen. Here, we see that the intervention group trend is higher than the control group, but only by 0.5  $\mu$ V or less.

### **Hypothesis 2**

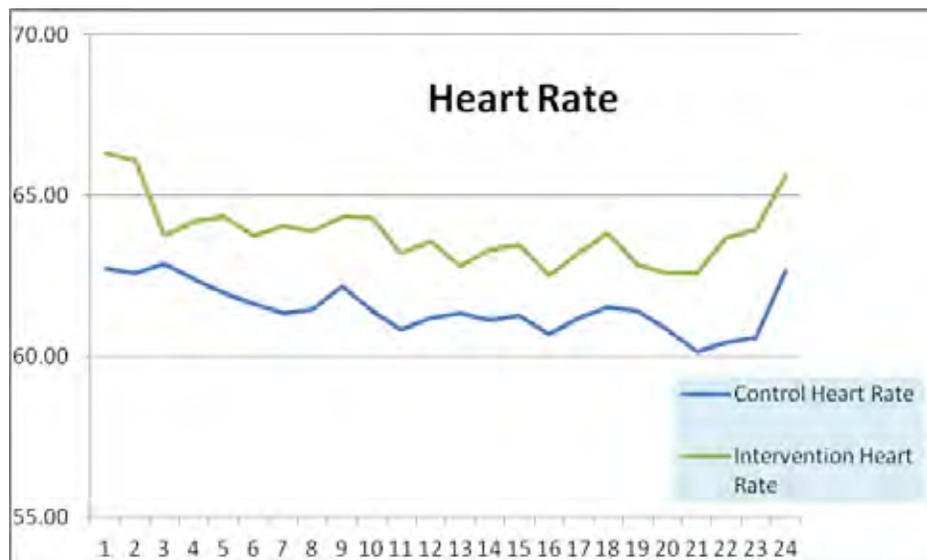
*Research results will show physiological correlates that demonstrate the efficacy of Healing Touch as it relates to relaxation and parasympathetic dominance.*

Temperature was slightly lower in the intervention group as compared to the group.



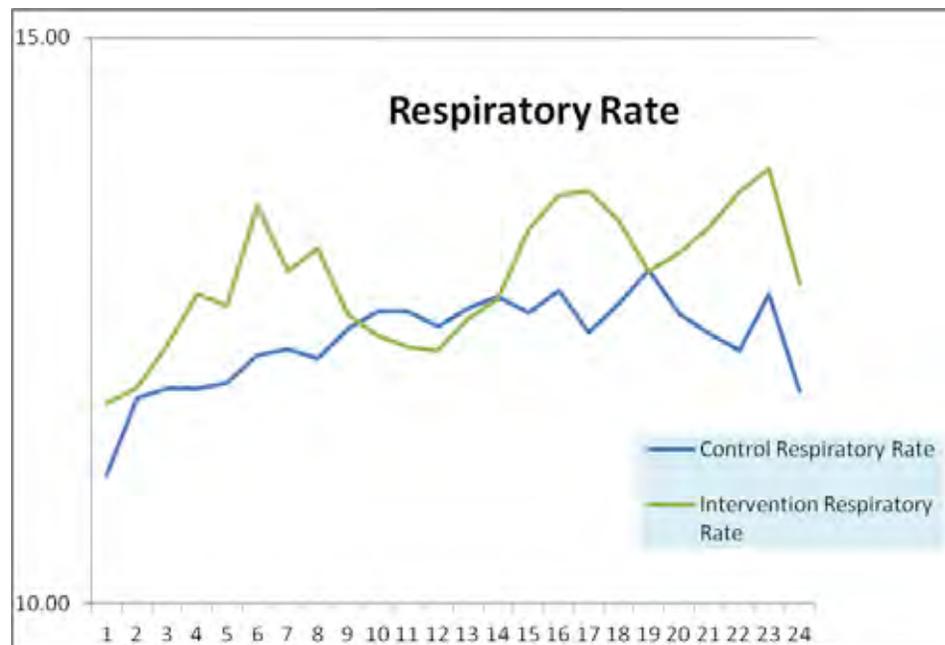
**Figure 5. Control versus Intervention Group - Changes in Temperature**

Heart rate was slightly (2-3 beats/minute) higher in the intervention group as compared to the group. There appears to be minute to minute response in the intervention group.



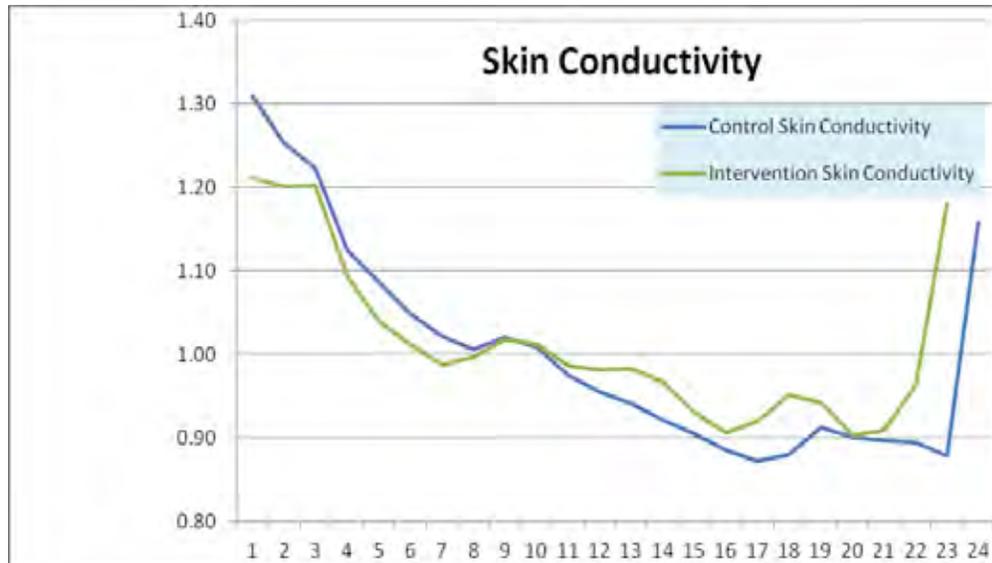
**Figure 6. Control versus Intervention Group - Changes in Heart Rate**

There were no correlations between respiration pattern and the intervention or control groups.



**Figure 7. Control versus Intervention Group - Changes in Respiration**

Figure 8 demonstrates the fall in skin conductivity for both groups (from approximately 1.3 to 0.9) as the session progressed, indicating increased relaxation. Both groups had a sharp rise in the skin conductivity near the end of the session, although the IG spike occurred two minutes sooner than the CG, during the post-eyes closed period.



**Figure 8. Control versus Intervention Group - Changes in Skin Conductivity**

### Hypothesis 3

*Research results will demonstrate a relationship between reduced anxiety or pain and receipt of Healing Touch session.*

**Results:** The treatment group had a greater decrease in anxiety from pre- to post-intervention scores, than those in the control group. The difference was 1.29 points on a 1-10 lickert scale There was a statistically significant difference ( $p = .03$ ) in the decrease in anxiety of the intervention group as compared to the control group, with a CI of 95% (-2.45; -0.12). This difference was similar in the multivariate estimate when we adjusted for age, gender, race and previous experience with massage or energy therapies.

Pain ratings showed no statistically significant decrease comparing between control and intervention groups post-pre. However, both groups did show a decrease in the pain rating.

		estimate (95% CI)	p-value	multivariable (95% CI)	p-value
Anxiety <sup>†</sup>					
Healing Touch	-3.5	-1.29 (-2.45, -	.03	-1.32 (-2.44, -0.20)	.02
Control	-2.2				
Pain <sup>§</sup>					
Healing Touch	-1.9	-0.42 (-1.65,	.50	-0.62 (-2.27, 1.04)	.46
Control	-1.5				

**Table 7. Effect of Healing Touch on Anxiety and Pain Self-Ratings**

CI=confidence interval

\* Difference between the median pre-treatment self-rating and post-treatment self-rating.

† Adjusting for age, gender, non-Caucasian race, and previous experience with energy therapies.

‡ Of those with self-rated anxiety before treatment (Healing touch N=22, control N=18)

§ Of those with self-rated pain before treatment (Healing touch N=13, control N=6)

## Qualitative Results

Two post-intervention, open ended questions were asked of the participants. The first was: What did you experience? The second was: Is there anything else you would like to share about the experience? All answers to these questions were input into separate spreadsheets for the intervention and control groups.

Thirty intervention participants and twenty-eight control participants answered either one or both of the questions. Those in the **intervention group** reported sixty-six answers which developed into three major themes and four minor grouping themes. The major themes were the phenomena of experiencing: 1) relaxation; 2) calming and 3) warmth. Fifteen other items were placed into the following four categories: 1) body awareness; 2) visual awareness; 3) awareness of thoughts and 4) awareness of feelings.

Table 8 shows the actual responses for these categories.

	Intervention Group Responses	Number	Percent
	relaxation	19	63.3
	calming	6	20
Body awareness	warmth	6	20
	sleepiness	5	16.6
	tingling/energy movement	4	13.3
	drifting/consciousness shift	3	10
	increased energy	2	6.6
	peaceful	3	10
	reduced tension/stress	3	10
	deeper breathing	2	6.6
	balance	1	3.3
	centered	1	3.3
Visual Awareness	colors seen	3	10
Thought awareness	meditative	2	6.6
Feeling awareness	quiet	2	6.6
	rest	2	6.6
	pleasant	1	3.3
	comfort/protection	1	3.3

**Table 8. Qualitative Responses from Intervention Group**

**Comments** from this group reinforce and give meaning to the 100% 'positive' rating post-intervention:

"This was a very cool experience and reminded me of the power of touch."

"Enjoyed this very much!"

"Thank you - happy to participate in more data collection to prove the efficacy of simple non-invasive techniques."

"Very interesting - would like to read about results."

"My mind chatter quieted while I received Healing Touch. Thank you so much for the break!"

"I am grateful for this time to rest and renew & relax. I appreciated the safe space and feeling cared for."

"This modality would be very helpful to anyone with stress, pain, recovery from surgery...for anyone."

"Extremely relaxing; would do it again - highly recommend experience."

"I feel more relaxed than usual by FAR!! And I am known to be a very relaxed, non-stressed person."

"I relaxed very easily compared to the usual amount of time it takes me to relax."

\*\*\*

The **control group** contributed fifty-two responses which created two major themes and four minor themes. Like the Intervention Group, this group also noted a predominance of 'relaxation' (75%) which should be expected due to the nature of the study. The second theme for the control group was 'sleep', with 25% noting this aspect of the experience. Fifteen other items were placed into the following four categories: 1) body awareness; 2) visual awareness; 3) awareness of thoughts and 4) awareness of feelings. Table 9 shows the actual responses for these categories.

	Control Group Responses	Number	Percent
	relaxation	21	75
	sleepiness	7	25
Visual Awareness	colors seen	3	11
	other visual images	2	7
Body Awareness	deeper breathing	2	7
	body movement	2	7
	warmth	1	3.5
Thought Awareness	concentration	2	7
	busy mind	1	3.5
	anxiety	1	3.5
	curiosity	1	3.5
	meditative	1	3.5
Feeling Awareness	peaceful	2	7
	quiet	2	7
	comfort	2	7
	rest	2	7

**Table 9. Qualitative Responses from Control Group**

**Comments** from this group follow:

"I felt myself getting anxious as I was lying here - I noticed my hunger, thought about my 'to do' list and was squirming."

"I felt like I was constantly thinking, but relaxed thoughts. I had a few images that came to mind but mostly thoughts. I noticed outside noise but blacked most out. Very relaxing."

"I can see the importance of getting adequate rest and I understand more why my children behave better after their nap."

"I used it as a time to meditate as well as reaffirm for myself that every day in every way I am getting better and better."

"It is a wonderful opportunity to be able to relax and help someone out at the same time. I enjoyed the experience and it helps to realize the benefits of taking a little time to relax."

"It was enjoyable to be able to participate and contribute as a volunteer to add to the data for this study."

## **Summary**

The results presented above clearly indicate that the intervention group consistently had higher amplitude in all bandwidths - Theta, Low and High Alpha, and Thalpha - although the differences were not statistically significant. Physiological parameters of temperature and heart rate were slightly lower for the control group, but again, not significantly so. Both groups followed the same pattern in temperature changes - elevation as they relaxed and then decrease as time continued. The graph of respiration showed no differences between the groups and no rhythmic patterns. Skin conductivity dropped as both groups relaxed. At the end, both increased sharply. The control subjects responded to the PI's voice and touch on the shoulder, as she requested that they open their eyes for the post-intervention, eyes open baseline. Interestingly, the intervention group responded a full two minutes sooner, with the spike in skin

conductivity. This coincided with the HT practitioner completing the session and stepping out of the subject's immediate energy field.

A more in-depth discussion of all findings can be found in the next chapter.

## **CHAPTER 5: DISCUSSION, SUGGESTIONS, AND CONCLUSIONS**

This chapter of the dissertation restates the research problem, reviews the methodology, and summarizes the findings, and offers suggestions for future research.

### **Statement of the Problem**

Although many studies have shown efficacy of energy modalities for decreasing pain and anxiety, none have correlated the brainwave pattern changes that accompany relaxation which occurs as a result of receiving a Healing Touch session. This study was designed to expand the field of knowledge regarding the mind-body-spirit connection as it relates to relaxation resulting from human touch, as demonstrated by a twenty minute 'dose' of Healing Touch .

### **Review of Methodology**

As stated in Chapter 3, the study reported here was a mixed methods, randomized, controlled, subject-blinded experimental design to evaluate the changes in brainwave patterns and physiological markers with or without a 20-minute dose of Healing Touch, delivered during administration of a standardized technique called the (1 on 1) Chakra Connection.

The design is diagrammed as follows:

R	O <sub>1</sub>	X	O <sub>2</sub>
R	O <sub>1</sub>		O <sub>2</sub>

(Where R = randomized; O = Observation; X = intervention.)

The study primarily used a quantitative approach, but also included self report surveys and two open ended questions after the session was complete.

The PI discussed the consent and pre-intervention survey, oversaw completion of surveys by participants and safeguarded de-identified information. The term “Healing Touch” was not used in the discussion prior to randomization – rather, ‘relaxation’ was used as a general term. The intervention group had a brief explanation of Healing Touch during the consent and pre-intervention data collection.

## **Summary of the Results**

### **Subjects**

Sixty-eight participant completed the study. Seven recordings and data sets were excluded from statistical analysis. The final analysis was conducted on thirty-four females and twenty-seven males. There were seventeen females in both the intervention and control groups. Fourteen males were in the intervention group and thirteen males were in the control group. Age ranges were from 18-91 years, with the median age being 40 years. Nearly ninety percent (88.5%) of the participants reported being of Caucasian descent.

Descriptive analysis was used to compare demographic factors and previous experience with energy modalities and massage therapy in the control and intervention groups. Pre-and post-test differences in self-assessed anxiety and pain were compared between groups using linear regression, controlling for variables of age, gender and previous therapy experience.

## **Changes in EEG**

Results from this study indicate that the intervention group had consistently higher amplitude in the theta, low alpha and high alpha frequencies than the control group. This group was consistently more aware or activated than the sleepier control group subjects. Comparative changes in EEG for control and intervention group were visualized graphically, assessing mean values and 95% confidence intervals. No statistically significant changes were noted.

## **Changes in Physiology**

Figure 8 demonstrates the fall in skin conductivity for both groups as the session progressed. Both groups had a sharp rise in the skin conductivity near the end of the session. The intervention group spiked when the practitioner completed the session and stepped silently out of the subject's energy field. The practitioner's hands had been above each subject's body for the last five minutes (hand positions) prior to the end of the session. She did not speak to, touch or otherwise indicate to any subject that the HT portion of the session had ended, or that she was going to move away from them. They proceeded with a two minute eyes-closed post-baseline and then a two minute eyes-open post-baseline recording where the PI asked them to open their eyes. On some level of consciousness, the intervention group appear to be aware that the practitioner moved away from them. This information was demonstrated in the changing skin conductivity.

The control group showed a consistent, sharp spike only in the last two minutes of the entire session, when the PI asked them to open their eyes.

## **Changes in Self-Reported Anxiety**

The findings clearly demonstrate a statistically significant decrease in perception of anxiety in the intervention group, while the control group did not have a significant decrease. Pre-intervention, twenty-two (71.0%) of the intervention group had some stress while nineteen (63.3%) of the control group reported stress. After the protocol was completed, thirteen (41.9%) of the treatment group reported anxiety, while eleven (36.7 %) of the control group reported an anxiety score. There was a statistically significant difference ( $p = .03$ ) in the decrease in anxiety of the intervention group as compared to the control group, with a CI of 95%. This self reported decrease reflects findings in the literature as well as the actual changes noted in Theta, Thalpa, Low Alpha and High Alpha brainwaves of the intervention group.

Thirteen (41.9%) of the intervention group reported pain prior to the session, while six (20%) in the control group reported pain at that time. Eight subjects in the treatment group reported pain post-intervention, while four (13.3%) control subjects did so. Decreased pain was not statistically significant for either group.

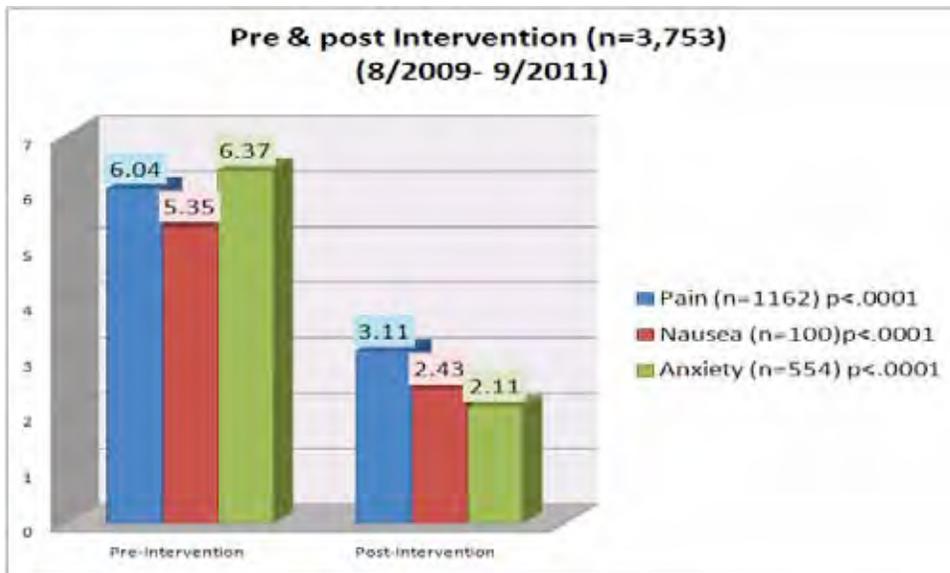
Changes in anxiety/stress and pain were assessed with linear regression models assessing median change in self-rated stress and pain levels pre- and post-sessions. Variables included prior experience with Healing Touch; prior experience with Therapeutic Touch; prior experience with Reiki; prior experience with other energy modalities; prior experience with massage; gender and race.

Linear regression and quadratic analysis were used for correlations of age. In the analysis, the statistician used age as a continuous variable (1,2,3,4,5...99) instead of a categorical variable (Group 1,2,3) because continuous variable allows for more

information to be used in the analysis. Either way, age seems to have had no effect on changes in anxiety or pain.

### Reader's Insights

The initial thoughts of this study were germinated during the time that the PI was working as a Holistic Nurse Specialist, offering complementary modalities including aromatherapy, guided imagery, massage and Healing Touch to patients in the hospital. Quantitative and qualitative outcomes data was compiled on over 3,000 patients receiving Healing Touch. The data mirrored what had been seen clinically - that patient anxiety/stress levels and pain decreased dramatically when those patients received a Healing Touch session from an experienced practitioner. The findings in the first two years were statistically significant for reduction in pain, nausea and anxiety (see Figure 10). As the PI noticed patients relaxing deeply, a question arose regarding what changes might show on an EEG during a Healing Touch session.



**Figure 9. Mission Hospital - Integrative Healthcare Pre-Post Changes**  
(Integrative Healthcare Department Annual Report 2010-11. Used with permission.)

The original protocol included the use of Heart Math biofeedback equipment to record heart and respiratory coherence. Curiously, the relaxed person receiving HT did not register as being coherent. One possible rationale is that the equipment is designed for use with awake, alert subjects who are working on active performance enhancement or creating shifts into coherence. The Heart Math equipment was ultimately not used in the study.

The research was originally planned to be conducted in the Health and Wellness Biofeedback Lab of a local university. The lab consisted of a sound proofed office furnished with a padded massage table for the subjects to lie upon. Their IRB conducted a full review and came to the conclusion that "touch was not safe for students" (part of the potential subjects). The IRB also refused to review peer reviewed studies on Healing Touch, alternately stating it was "all placebo any way" and "a medical intervention" which was outside their jurisdiction as an IRB.

In hindsight, the refusal of the university to approve the IRB (a second, expedited review was approved by another institution) was a blessing. The use of a professional healthcare office provided a setting closer to clinical reality. It also allowed for more flexibility with scheduling participants and extended hours for the PI and intervention nurse.

### **Practitioner Expertise**

Consistency was maintained by utilizing only one practitioner to offer the HT sessions. Use of an advanced or mature practitioner is recommended by most articles in the literature. This person has been a Certified Healing Touch Practitioner since 1993 and offers HT to patients in an acute care facility, an average of three days per week. Her

patient experience included working with 'healthy' and ill clients: medical surgical patients, adult and pediatric ICU patients, those undergoing chemotherapy and radiation therapy, and others.

### **PI Preparation**

The PI completed both the Holos and federal CITI training in preparation for working with human subjects. In order to address technical proficiency, she partook of training sessions over several months with a local university faculty member certified in biofeedback (BCIA), in order to ensure correct placement of sensors, use of equipment and basic analysis and interpretation skills by the PI. This faculty member routinely used the BioGraph Infiniti software and interpreted data gathered from it at her university.

The PI also made use of the Thought Technologies company website which provides tutorials to assist in learning how to apply and use the equipment, as well as data interpretation. The PI paid for and attended eight hours of individual training sessions (over four days) with the software/hardware company experts. During the first session, the PI created a customized script (See Figure 10 below) to standardize timing and process flow of the protocol. Statistical measures were defined and set.

The second training session focused on review of several recording sessions to ensure correct artifact filtering by the PI. No changes were made in the protocol or recording parameters for the subsequent participants. During the third session the PI began to convert excel data into graphs and pie charts after the company expert reviewed the data. The last session was used for strategic review of findings and statistical outcomes.



**Figure 10. BioGraph Infiniti screen customized for this study**

### **Dissemination of Results**

Participants were asked if they would like to receive a summary of the study results upon completion of the dissertation (after September 2012). Those who indicated that they would like to receive the study results will be mailed printed information including the purpose of the study, a brief background and theoretical information section, and the results of the study including the discussion. All participants will be informed that the entire dissertation will be available on-line at [www.hugs-edu.net](http://www.hugs-edu.net) if they would like to read it in its entirety.

The PI plans to provide the faculty and students of South College (Asheville, NC) with a presentation of findings, in appreciation for their participation and support of the study. Presentations of findings will also be offered at the hospital Nursing Research Council meeting and at national nursing conferences. After more in-depth analysis of the findings, submission in peer reviewed journals of several disciplines may be considered.

## **Relationship of Current Study to Prior Results**

The findings of this study supported past research which found a positive correlation between receiving Healing Touch and self-reported decrease in anxiety. The statistically significant decrease supports results found by researchers including Dowd, Tang, Wilkinson and others. These differences were noted across all age groups within the study. However, this study did not demonstrate a difference in physiological parameters between the intervention and control groups. Qualitative themes included enhanced relaxation within both groups. The control group noted stronger themes related to thoughts while the intervention group cited associations with body awareness, including noticing the warmth of the practitioner's hands.

The use of consistent dose and specific HT technique will allow for replication of this study in the future - perhaps with a larger sample size. Utilizing an experienced, certified practitioner also standardized the protocol.

## **Explanation of Unanticipated Findings**

One participant's recording showed a 60 Hz band throughout the recording, which often indicates electrical interference. The PI started recording sessions twice with the same results. There were no other electrical components in the research setting - cell phones were off, no computers were in use (other than PI's for data recording). The participant did share at the end of the session that he had requested the spirit of a recently deceased person to communicate with him during the session. It cannot be determined if that had an impact upon the electronic recording, but this may be an interesting avenue to pursue in future studies.

## **Implications for Practice**

The intervention group showed a statistically significantly ( $p = .03$ ) decrease in anxiety after Healing Touch. One hundred percent of the intervention group reported a positive experience. Healing Touch recipients reports feeling 'calmness', a sense of being 'cared for', and 'relaxation'. The control group subjects reported relaxation and sleepiness.

## **Discussion**

**Null Hypothesis 1:** *Research results will not demonstrate a relationship between changes in brainwave patterns and receipt of Healing Touch session.* Null Hypothesis is accepted, due to lack of statistically significant outcomes. However, the trend of all IG brainwave patterns being higher than CG is unusual and warrants further data analysis and future studies.

**Null Hypothesis 2:** *Research results will not show physiological correlates that demonstrate the efficacy of Healing Touch as it relates to relaxation and parasympathetic dominance.* Temperature, heart rate and skin conductivity patterns in IG and CG were similar. The results did not reach statistical significance at a 95% confidence interval. Null hypothesis is accepted.

**Null Hypothesis 3:** *Research results will demonstrate a relationship between reduced anxiety or pain and receipt of Healing Touch session.* Hypothesis rejected as it relates to anxiety, since the analysis demonstrated a statistically significant decrease in anxiety of IG when compared to CG. The decrease in the self-reported pain scores were not statistically significant, so this aspect of the hypothesis is accepted.

## **Suggestions for Future Research**

Future studies might include the use of different Healing Touch techniques; practitioner choice of techniques used and energetic determination of duration of session; or comparison of 'hands-on' versus 'hands-off' the body during the intervention. Comparing the effects of Healing Touch versus music, Reiki, or other modalities may show efficacy of these modalities for reduction in pain, anxiety or other symptoms. A study designed with inclusion criteria of active pain would be a better format to study correlations of pain relief.

Future research using the same protocol as this study could include 100 subjects in each group, and perhaps a more statistically meaningful difference may be demonstrated.

The person with continuous high band frequency is a nurse in the military reserves. This finding presents another provocative avenue for possible research. Studying brainwave and physiological changes with subjects from active military personnel in both control and intervention groups may show interesting results.

## **Conclusions**

This research study was designed as a randomized controlled trial, to examine changes in brainwaves and physiological parameters, with the intervention being administration of a standardized 20 minute Healing Touch technique. Both qualitative and quantitative data were collected and analyzed. A statistically significant decrease in anxiety was demonstrated in the intervention group. While not statistically significant in any single category, the trend towards increased brainwave amplitude, or number of neurons firing in Theta, Thalpha, Low, and High Alpha is consistent within the

intervention group. Lower amplitudes are seen consistently in the control group. This is an unusual finding which warrants further research.

Qualitative themes show increased body awareness for the intervention group, while the control group had a stronger focus on thoughts. Although further research is required to deepen the understanding of these findings, the current research results are a good starting point for continued exploration.

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## **APPENDIX B**

### **Example of E-mail Response to Initial Inquiry from Potential Subjects**

Thank you for expressing an interest in being a participant in this study on relaxation. The study is being conducted for my doctoral work at Holos University Graduate Seminary. My focus is Integrative Healthcare. The study has been approved by the HUGS Institutional Review Board (IRB).

I will be studying males and females age 18 years or older. There are a limited number of volunteer positions available, according to age and gender, so the first thing I need to know is your gender and age (in years). Please send me an e-mail with that information and I will follow-up with more study details.

Once I have basic information, and you agree to participate, we will set up an appointment for you to visit the site where the study will be conducted.

Thank you again for your interest. If you have any questions, please feel free to contact me here or at 828-260-7521. I hope that you will join the study.

Denise Anthes, MBA, BSN, RN

[relaxationresearch@gmail.com](mailto:relaxationresearch@gmail.com)

## **APPENDIX C**

### **Examples of Response to Initial Inquiry from Potential Subjects**

Thank you for expressing an interest in being a participant in this study on relaxation. My name is Denise Anthes and I am a registered nurse and a doctoral student.

This study is being conducted for my doctoral work at Holos University Graduate Seminary. My focus is Integrative Healthcare. The study has been approved by the HUGS Institutional Review Board (IRB).

I will be studying males and females age 18 years or older. There are a limited number of volunteer positions available, according to age and gender, so the first thing I need to know is your gender and age (in years).

Once I have basic information, and you agree to participate, I will set up an appointment for you to visit the professional office space where the study will be conducted.

Would you please tell me your gender and age in years?

Gender \_\_\_\_\_ Age \_\_\_\_\_ (Completed by Principle Investigator during this phone call.)

Thank you again for your interest. If you have any questions, please feel free to contact me at 828-260-7521 or at [relaxationresearch@gmail.com](mailto:relaxationresearch@gmail.com) I hope that you will join the study.

## APPENDIX D Random Integer Generator

### Random Integer Generator – Group 1F

Odd = control, Even = intervention

Here are your random numbers:

11 3 6 4 3 1 1 1 10 10 10 8

Timestamp: 2012-01-15 15:04:51 UTC

### Random Integer Generator – Group 2F

Odd = control, Even = intervention

Here are your random numbers:

8 7 5 4 12 3 8 7 10 3 8

Timestamp: 2012-01-15 15:06:35 UTC

### Random Integer Generator – Group 3F

Odd = control, Even = intervention

Here are your random numbers:

9 9 12 4 12 4 5 1 5 1 8

Timestamp: 2012-01-15 15:10:39 UTC

## Random Integer Generator – Group 1M

Odd = control, Even = intervention

Here are your random numbers:

1 9 11 8 9 12 2 3 2 6 1

Timestamp: 2012-01-15 15:11:59 UTC

## Random Integer Generator – Group 2M

Odd = control, Even = intervention

Here are your random numbers:

8 10 3 9 11 9 5 4 7 12 10 2

Timestamp: 2012-01-15 15:14:31 UTC

## Random Integer Generator – Group 3M

Odd = control, Even = intervention

Here are your random numbers:

2 3 3 5 2 7 8 8 11 12 3

Timestamp: 2012-01-15 15:34:48 UTC

SOURCE:

<http://www.random.org/integers/?num=12&min=1&max=12&col=12&base=10&format=html&rnd=new>

# APPENDIX E

## CITI Completion Report

### CITI Collaborative Institutional Training Initiative

#### Human Research Curriculum Completion Report Printed on 11/26/2010

**Learner:** Denise Anthes (username: denise.antes@msj.org)  
**Institution:** Mission Health System  
**Contact Information** Department: Integrative Healthcare  
 Phone: 828-213-1104  
 Email: denise.antes@msj.org

**Group 1. Biomedical Research Investigators and Key Personnel:**

**Stage 1. Basic Course Passed on 11/26/10 (Ref # 5245917)**

Required Modules	Date Completed	
Introduction	11/16/10	no quiz
History and Ethical Principles	11/16/10	6/7 (86%)
Basic Institutional Review Board (IRB) Regulations and Review Process-	11/17/10	5/5 (100%)
Informed Consent	11/17/10	4/4 (100%)
Records-Based Research	11/17/10	2/2 (100%)
Genetic Research in Human Populations	11/17/10	2/2 (100%)
Research With Protected Populations - Vulnerable Subjects: An Overview	11/17/10	4/4 (100%)
Vulnerable Subjects - Research Involving Minors	11/17/10	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women and Fetuses in Utero	11/24/10	3/3 (100%)
Group Harms: Research With Culturally or Medically Vulnerable Groups	11/24/10	3/3 (100%)
FDA-Regulated Research	11/24/10	5/5 (100%)
Research and HIPAA Privacy Protections	11/26/10	11/11 (100%)
Mission Health System	11/26/10	no quiz

**For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.**

Paul Braunschweiger Ph.D.  
 Professor, University of Miami  
 Director Office of Research Education  
 CITI Course Coordinator

Return

## **APPENDIX F**

### **Informed Consent**

Holos University supports the practice of protection for human subjects participating in research. The following information is provided to help you decide whether you wish to participate in the study presented to you.

We are interested in studying the changes in brain waves and physical measures during relaxation. The study will take place in Asheville, North Carolina, using equipment that is regularly used to monitor people during biofeedback. If you agree to participate in the study, demographic information will be collected at the beginning of the session. You will lie on a massage table, fully clothed, for approximately 30 minutes, while your heart rate, respirations, temperature and brainwaves are recorded using non-invasive sensors on your fingers, earlobes and the top of your head. The sensors will amplify electrical signals from your body and then translate the signals into digital information which will be recorded on a computer. No electricity will be conducted into your body. You will be asked to answer a few brief questions at the end of the session.

Your decision to participate in this study is voluntary. If at any time during this study you wish not to participate, you may do so without any consequence.

There are no anticipated physical risks or harms to you as a result of your participation in the study. Participation in the study will be kept confidential. No one will be notified about your participation or non-participation in this study.

The information that you provide in questionnaires will be kept confidential. Only the researcher will have access to the data collected in this study which will not contain your name or other identifying information. Your anonymous comments and evaluation at the end of the session may be used in a research paper. The information obtained from this study may not help you directly. However, it may help others by advancing knowledge related to physical responses during a period of relaxation.

There is no cost to you. As compensation for the time spent in the study, each participant who is randomized to the control group will be offered a complimentary 30 minute Healing Touch session. Gift certificates will be awarded at the conclusion of each testing day and will be valid for three months.

If you would like additional information concerning this study before or after it is completed, please feel free to contact Denise Anthes by phone, mail or email. If you have concerns about the study, please contact the Holos University at (828) 251-6476. For a copy of the completed study, contact Denise Anthes. Results will be available after September 2012.

(over please)

Thank you for your cooperation!

Denise Anthes, RN, MBA  
Principal Investigator  
P.O. Box 1141  
Weaverville, NC 28787  
relaxationresearch@yahoo.com  
828-275-5949

Bernard O. Williams, Ph.D.  
Committee Chairman  
Holos University Graduate Seminary  
www.holosuniversity.org  
888.272.6109

With my signature, I affirm that I am at least 18 years of age, wish to participate in the study, have read, understand, and agree to this consent form, and have received a copy of the same document.

\_\_\_\_\_  
Signature of volunteer participant

\_\_\_\_\_  
Date

Please PRINT YOUR NAME HERE: \_\_\_\_\_

Your Address: \_\_\_\_\_

\_\_\_\_\_  
Email: \_\_\_\_\_ Telephone: \_\_\_\_\_

**APPENDIX G**  
**Demographic Information**

**Please DO NOT write your name on this form. The information is confidential.**

Please circle the best response or fill in the blank to best describe yourself.

**Gender:**      a) male              b) female

**Age:** \_\_\_\_\_

**Ethnicity:**    a) African American  
                  b) Asian  
                  c) Caucasian  
                  d) Hispanic  
                  e) Native American  
                  f) other: please specify \_\_\_\_\_

**Brief Health History:** (please circle any conditions you have currently)  
Cancer              Cardio-vascular              Diabetes              Digestive/Eating disorder  
Hearing              High blood pressure              High cholesterol              Kidney  
Lung/Pulmonary              Vision              Accident/trauma              Alcohol/drug problems  
Depression              Stroke              Weight Problems

**Do you currently have any pain? (please circle one answer)      Yes      No**  
If yes, please rank: (0= no pain, 10 = highest pain)    0 1 2 3 4 5 6 7 8 9 10

**Are you currently experiencing any stress? (please circle one answer) Yes No**  
If yes, rank: (0= no stress, 10 = highest stress)    0 1 2 3 4 5 6 7 8 9 10

**What is your expectation of this experience?**  
-----negative-----neutral-----positive----

**Have you ever experienced:** (circle all that apply)  
Reiki    Therapeutic Touch              Healing Touch              Energy Healing              Massage

## APPENDIX H

### Chakra Connection (used with Permission of Healing Touch Program)

Healing Touch Level I Notebook - Part III

80

## Chakra Connection

### Definition

The Chakra Connection is a full body balancing technique that facilitates movement of energy from chakra to chakra by connecting the major and minor chakras, and opening them to flow freely. The Chakra Connection was developed by W. Brugh Joy, M.D. and is referred to in his book *Jays Way*. (pp 270-274)

### Use

Chakra Connection is designed to connect, open and balance the energy centers and enhance the flow of energy in the body. It can be used alone or in combination with other energy techniques.

### Procedure

Chakra Connection can be done on the self, one on one, or two persons on one. The technique requires the activation of the energy in the practitioner's hands in order to facilitate energy movement in the client's body.

*Note:* The Chakra Connection can be done from either side of the body. For teaching purposes, the illustrations in the book are shown starting at the right side.

### CHAKRA CONNECTION: ONE ON ONE

1. Begin with the client lying on his back and the practitioner standing on the client's right side.
2. Hand positions are held in place for approximately one minute or until there is active energy flow which can be felt in the hands. Move rhythmically up the body from the feet to the head as indicated in the hand positions.
3. Move the hands one at a time, maintaining the connection and following the pattern as illustrated on the next page.

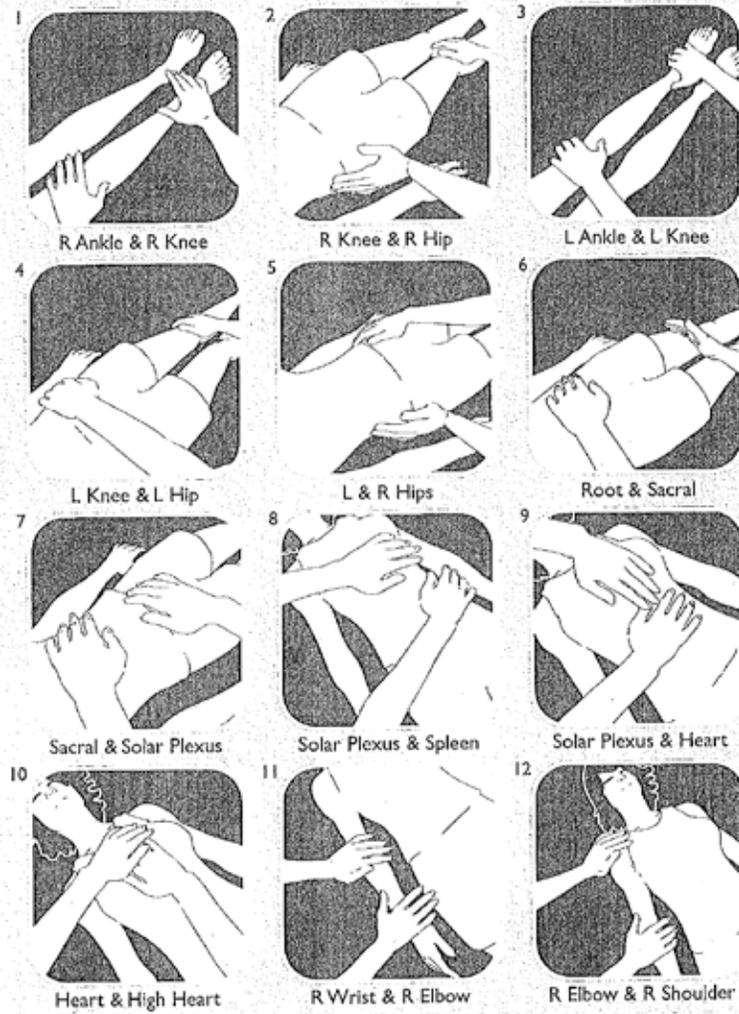
4. Place hands gently on or over the following areas.

The pattern is as follows:

- Right ankle and right knee
- Right knee and right hip
- Left ankle and left knee
- Left knee and left hip
- Both hips
- Root and sacral chakras
- Sacral and solar plexus chakras
- Solar plexus and spleen
- Solar plexus and heart chakra
- Heart chakra and high heart
- Right wrist and right elbow
- Right elbow and right shoulder
- Left wrist and left elbow
- Left elbow and left shoulder
- Both shoulders
- High heart and throat chakra
- Throat chakra and brow chakra
- Brow chakra and crown chakra
- Crown chakra and transpersonal point

When working with the arm on the opposite side of the body, the practitioner may reach across or, for better body mechanics and comfort for the client, move around to the other side of the client. Connection with the client may be maintained through a light touch or with conscious intention.

Chakra Connection: One on One





L Wrist & L Elbow



L Elbow & L Shoulder



L & R Shoulders



High Heart & Throat



Throat & Brow



Brow & Crown



Crown & Transpersonal Pt.

**APPENDIX I**  
**Post-Relaxation Survey**

**Please DO NOT write your name on this form. The information is confidential.**

**Do you currently have any pain? (please circle one answer)**      **Yes**              **No**  
If yes, please rank: (0= no pain, 10 = highest pain) 0 1 2 3 4 5 6 7 8 9 10

**Are you currently experiencing any stress? (please circle one answer)**      **Yes**              **No**  
If yes, please rank: (0= no stress, 10 = highest stress) 0 1 2 3 4 5 6 7 8 9 10

**How would you rate your experience of the relaxation session?**  
--negative-----neutral-----positive--

**What did you experience?** \_\_\_\_\_  
\_\_\_\_\_

**Is there anything else you would like to share about the experience?**  
\_\_\_\_\_  
\_\_\_\_\_

## APPENDIX J

### Gift Certificate For Control Group Participants



Thank you again for your interest. If you have any questions, please feel free to contact me at [relaxationresearch@gmail.com](mailto:relaxationresearch@gmail.com) or at 828-260-7521.

Denise Anthes