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NEUROFEEDBACK RESULTS: A CROSS COMPARISON OF
OPINION WITHIN THE PROFESSION

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Social Work

by
Susan Adelia Anthes
September 2002

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OPINION WITHIN THE PROFESSION

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Susan Adelia Anthes
September 2002

Approved by:


Dr. Trang Hoang, Faculty Supervisor
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ABSTRACT

The study analyzed professionals' opinions about biofeedback and neurofeedback. Five hundred sixty three surveys were sent over the Internet to neurology, pharmacy, psychology and medical experts residing in the United States. 32 respondents comprised the study sample consisting of 13 males and 19 females. Demographic information was collected as well as statements of opinion. Primary questions included: years of knowledge, training and overall opinion about the procedure. Attitudes about successful outcome of biofeedback or neurofeedback treatment for disorders including: anxiety, attention deficits, seizures, autism, addictions, trauma and anger management were examined thus placing each respondent into one of three categories: 'for' 'against' or undecided/unknown'. Skepticism of professionals in other fields was confirmed while biofeedback and neurofeedback experts stated their opinions had changed from skepticism to belief when knowledge was gained. Statements by neurofeedback specialists found that significant results are not always obtained due to the inexperience of the practitioner. Therefore, improved neurofeedback training could lead to better results.

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DEDICATION

Sarah M. Harpst, my daughter

For the sacrifices she made

Ruth A. Anthes, my mother

For her support during challenging times

Dr. Roger H. Morgan, Psy. D.

For his encouragement, wisdom and guidance

Friends:

Cynthia Schreihans, M.B.A.

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All respondents

For their dedication to research and willingness to assist

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CHAPTER ONE

INTRODUCTION

The contents of chapter one presents an overview of the project. The thesis statement and practice context are discussed followed by the purpose of the study and milieu of the problem. Finally, the significance of the project for social work is presented.

Explanation of Neurofeedback Procedure with Trauma Patients

Provided in Appendix I is an example of abnormal brain function for one disorder introduced in the previous literature review. To assist readers outside of the psychological profession, information has been provided to allow the reader to further understand the components of neurofeedback.

Problem Statement

Biofeedback came to the attention of the Western world in the 1960's; although its origin started at the early part of the century. The procedure was born from a method of relaxation called 'Autogenic Training' developed by J.H. Schultz in Germany. From there, Edmund Jacobson designed a technique in the 1930's called 'Progressive Relaxation.' The relaxation method taught clients cause

and effects of tension and stress along with methods to counteract anxiety (Grierson & Othmer, 1999).

The western world soon became aware of Eastern yogic traditions, incorporating the relaxation procedures into what eventually led the way toward biofeedback (Grierson & Othmer, 1999). While fundamental discoveries were made about this technique, new computerized technology has expanded biofeedback from its infancy stage to a even higher dimension.

Unfortunately, early studies gave biofeedback a bad reputation for a couple of reasons. Mind-altering drugs such as LSD were associated with the testing of biofeedback during the 1960's. Additionally, the professional community was not ready to accept a technique that did not fit into any traditional theory of treatment (Robbins, 1998).

Modern technological advances demand new research on biofeedback. Neurofeedback is an offshoot of biofeedback. However, neurofeedback has incorporated the latest computerized technology. Compared to other forms of treatment, neurofeedback therapy is an innovative form of treatment for disorders and conditions that range from anxiety, addictions, and biological disorders. While medical techniques have advanced dramatically over the

last century, disparities on whether the treatment is valid continue to exist. Discord of opinion within the medical community often obstructs neurofeedback treatment (Abarbanel, 1995; Barkley, 1993; Byers, 1995; Matheson, Bruce, & Beauchamp, 1974; Othmer, 2001; Robbins, 1998).

Psychological conditions and disorders such as, post traumatic stress, anxiety, addiction, attention deficit and anger control are most often treated through the use of pharmacological intervention in addition to psychotherapy. Other conditions and disorders considered organic in nature such as seizures and autism, are often treated through pharmacological treatment. Thus, medication is administered; symptoms are often masked. However, technological advances have been introducing new methods of treatment.

Research on brain wave activity has revealed new discoveries that have opened the door to new innovative types of treatment. While some medical professionals are hesitant about neurofeedback, many practitioners are excited about the new ground-breaking treatment technique (Hoffman, Stockdale, Hicks & Schwaninger, 1995; Othmer, 2001; Robbins, 1998). Neurofeedback has especially been found to reduce symptoms caused by trauma either from physical injury to the brain, i.e., closed head injury, or

emotional trauma that often results in post traumatic stress (Abarbanel, 1995; Hoffman et al., 1995; Robbins, 1998).

Specifically, reviews have been revealing that head trauma often associated with childhood abuse as a result of closed head injuries, increases blood flow to the brain and releases free radicals, thus causing damage to brain cells (Jastremski, 1998). Through the view of the medical model, researchers have shown that while a child appeared to have survived trauma through observation, damage still occurred (Hymel et al., 1997; Study Of Brain, 2000).

Not only has the recording been in the form of memory, but just as distressing is the fact that the brain itself biologically molded through adaptation such as chemical change and electrical hertz speed deep within the brain (Byers, 1995). Children who have "damaged brains" in the manner described, have often not been diagnosed. The effects of the abuse have often remained undiscovered until the child grew into adulthood. As an adult, the individual lives with a ticking time bomb in his or her head over the course of many years. Not surprisingly, these individuals have tried a variety of means to alleviate the anxiety, pain and suffering. Other

conditions in addition to trauma are treated with behavioral and pharmacological interventions as well.

Common knowledge dictates that attention deficit disorder, often diagnosed in childhood, is another condition that is primarily controlled through pharmacological treatment. Both children and adults suffering from attention deficit disorder, (ADHD), struggle with attention deficits that hamper daily activities. This disorder interferes with socialization and often impedes learning. Studies show that the brain wave activity of an individual who is diagnosed with ADHD operates at an abnormal speed (Abarbanel, 1995; Kaiser & Othmer, 2000). In addition to treating ADHD, neurofeedback is used to treat seizures as well.

Neurofeedback therapy has been used to treat seizures for several years. Curriculum standards teach students that the medical community has long been aware that seizures are caused by electrical misfiring deep within the brain. However, neurofeedback is used for many other disorders in addition to ADHD and seizures. Research conducted in recent years has also revealed that neurofeedback provides favorable results for other conditions, such as anger control, addiction reduction, as well as improvement in functioning for individuals

diagnosed with autism (Robbins, 1998). However at present, opinion in relation to the efficacy of neurofeedback is being questioned.

The primary focus of this research was to investigate why there is a difference of opinion on neurofeedback therapy between professionals who are knowledgeable in abnormal brain function. Investigation of attitudes within the professional community is important to treatment modality. Determining why controversy exists, and the reason why neurofeedback is not always considered to be a valid and reliable form of treatment, may help lead the path to a new treatment technique. This study was performed with the intent of exploring new technological advances. Because no research was found investigating opinions on neurofeedback, it was important that the research was done at this time.

Practice Context

The social work profession has an eclectic approach in that it incorporates a variety of practice models. The social workers' role is to be as knowledgeable as possible about existing treatments as well as new breakthroughs. If the worker is to advocate in the best interest of their client, knowledge and expertise in the area of neurofeedback, is one more tool at his/her discretion.

Purpose of the Study

The purpose of the study was to analyze different opinions of professionals about neurofeedback treatment.

The study examined the opinions of specialists knowledgeable in neurology, pharmacy, psychology and brain functionality. Very inappropriate and dangerous is the belief that any one-treatment technique is the magic solution. Therefore, in order to ensure an unbiased view of the method, it is important to elicit the views of those who oppose neurofeedback (Barkley, 1993). In comparison with articles promoting neurofeedback, few articles were found that discussed negative attitudes, and no research was found that investigated a cross comparison of opinions within the professional community.

Significance of the Project for Social Work

The knowledge of the author has deemed the study to be very significant for the social work field. A holistic healing approach is part of social work practice. Social work practitioners are dedicated to reducing pain and suffering by using a combination of tools. The social work field is very concerned with early treatment intervention.

Studies on various forms of treatment for psychological disorders are important in anticipating the

client living a productive life by reduction of anxiety, depression, anger, addictive problems, etcetera. By treating those individuals who have suffered from these disorders, society wins as a whole. Reduction of services in the mental health field allows for increased work performance and job retention. Plus, a reduction of rage amongst inmates and reducing social security and social service expenses are all areas that can benefit from neurofeedback treatment. In addition, it was especially important that research in this area was done to allow the professional community the opportunity to reassess the improved technological advances in neurofeedback.

While the research in this study focused on attitudes amongst specialists within the field of neurofeedback, future studies should focus on the difference of opinion among insurance companies and their willingness to pay for neurofeedback treatment. For every scientific study done, third party insurers may become convinced that the treatment is cost effective and worthwhile.

What are the reasons for varying opinions among professionals about the efficacy of neurofeedback as a treatment method?

CHAPTER TWO

LITERATURE REVIEW

Introduction

Chapter two discusses research findings on neurofeedback. Of particular concern, relevant literature related to conflict within the community of specialists who have extensive knowledge on the subject was studied. The study was conducted for the purpose of understanding varying opinions of professionals. In light of the expansive amount of literature written endorsing the positive effects of neurofeedback, little research was found divulging opposing views.

This section is inclusive of three segments. First, long term effects of emotional trauma in relation to changes that occur within the brain will be discussed. Second, the literature review will examine the positive reviews on neurofeedback followed by critical opinion of the procedure.

Long Term Biological Effects of Child Abuse

Many aspects still need to be explored about the effects of childhood emotional trauma. Scientific researchers know the synaptic connections and chemicals in

the brain are not fully developed at birth but continue to develop up through adulthood (McLeon Researchers Document, 2000; Brownlee, 1996).

Recent research has shown that neglect without physical abuse re-wires the brain. A research study conducted by the McLeon Hospital in Massachusetts discovered that there are four brain abnormalities associated with child abuse and neglect. The study found that the four main changes to the brain included: limbic irritability, increased vermal activity, arrested development of the left hemisphere and deficient integration between the left and right hemispheres (McLeon Researchers Document, 2000).

In addition, Greenes and Schutzman (1999) discovered that in MRI scans, the corpus callosum was smaller in the patients who had been abused when compared to healthy participants. The corpus callosum is responsible for sending information back and forth between the right and left hemisphere.

Martin Teicher, M.D., Ph.D., director of the Developmental Biopsychiatry Research Program at McLeon hospital stated:

A child's interactions with the outside environment causes connections to form between brain cells. These connections are pruned during

puberty and adulthood. So whatever a child experiences, for good or bad, helps determine how his brain is wired. (McLeon Researchers Document, 2000, p. 1)

The limbic system controls our emotions and drives. Trauma experienced by a child is hypothesized to cause disturbances between the electrical nerve impulses while the limbic system is working to communicate between the cells. The McLeon study found that patients who had been abused as children were twice as prone as non-abused patients to have an abnormal EEG. An additional discovery in the same study revealed that the cerebellar vermis, (the section of the brain that controls emotion and attention and regulates the limbic system) was also affected by childhood trauma (McLeon Researchers Document, 2000).

The researchers found that, "the abused patients had higher vermal activity in order to quell electrical irritability within the limbic system" (McLeon Researchers Document, 2000, p. 4). Simply said, Researchers discovered that individuals who had been sexually abused as children had a higher amount of blood flow to the brain.

Further hypothesized, trauma in childhood may impair the cerebellar vermis from maintaining emotional balance. This data led researchers to believe that individuals who

have been reared in violence and trauma would function in a high state of arousal twenty-four hours a day. The mind adapts to its environment. Therefore, the child's brain functions in the "fight or flight" arena to protect the body from the individual's surroundings (Abarbanel, 1995; Brownlee, 1996; McLeon Researchers Document, 2000).

The McLeon Study (2000) revealed the left and right hemispheres of the brain were found to have been altered by childhood trauma. Furthermore, the left hemisphere, (the section responsible for language) had been developmentally arrested in the patients exposed to childhood trauma. This article cited six studies on left and right brain functioning of abused patients. All six studies found that the development of the left hemisphere in the abused patients was developmentally deficient. The study speculated that the deficiency might very well contribute to depression and memory impairments.

Other literature such as L'Abate (1999) confirms the McLeon study. Trauma, whether in the form of emotional, physical or sexual, directed toward a child, alters the brain's chemistry. Once thought of as genetically designed, the brain is now known to be plastic in nature, thus molding to experience. In the article titled, The Biology of Soul Murder Brownlee (1996) stated,

...that abuse and neglect early in life can have even more devastating consequences, tangling both the chemistry and the architecture of children's brains and leaving them at risk for drug abuse, teen pregnancy and psychiatric problems later in life. (p. 1)

One often sees patients who suffer from startle response, also known as hyper-vigilance that are given the diagnosis of post-traumatic stress disorder. A change in chemistry within the brain is responsible for startle response in addition to many other neurological disorders associated with abuse. Evidence has shown that abused or neglected children have an abnormal level of cortisol in the brain. A study conducted on Romanian children in orphanages found that irregular cortisol levels in the brains of these abused and neglected children had a direct correlation to cognitive and developmental delays (Abarbanel, 1995; Brownlee, 1996).

It is predicted that for many survivors of childhood trauma, frustration with the medical system and currently accepted forms of treatment have led the trauma survivor to give up and simply live with the residual emotional and physical ailments. A few, venture out to find alternative means to alleviate the suffering. Some specialists argue that neurofeedback has proved to be the innovative treatment technique for lingering maladies that doctors

cannot seem to treat with medication and psychotherapists cannot alter with therapy (Abarbanel, 1995; Byers, 1995; Hoffman et al., 1995).

L'Abate, (1999) states that combining psychotherapy with neurofeedback can provide a synergistic effect in treatment. Important to note, an eclectic approach to treatment of childhood trauma has shown the best resolve. Neurofeedback is a non-evasive procedure that could possibly enhance relaxation by re-wiring the electrical impulses within the brain, which in turn would help functional abilities (Thomas & Sattlberger, 1995).

If the brain's wiring were caused to miss-fire due to trauma, then one could hypothesize that neurofeedback could re-wire the brain to fire correctly. Once this has been accomplished, the brain functions at normal capacity. Studies have been finding that the re-wiring of the brain through this technique tends to be permanent in most cases. However, one study reviewed stated that if the child abuse was severe and there have been many lingering conditions such as depression, seizures and anxiety, some individuals may have to have up to 100 sessions, and for a few, lifelong treatment in order to keep the condition in check. For most however, 20 to 50 sessions is sufficient

to re-wire the brain permanently (EEG Spectrum International, 1998).

Neurofeedback Procedure to Treatment

Neurofeedback allows the technician to assess, monitor and treat the patient by observing the patient's brain wave activity on the computer monitor. The specialist custom designs a treatment plan for the patient by observing the various electrical charges within the patient's brain. Prior to recording brain wave activity, the technician takes a complete history of the patient's psychological condition.

Dr. Siegfried Othmer, Ph.D., physicist and founder of EEG Spectrum, developed the state of the art neurofeedback computer technology after discovering that biofeedback treatment helped his son gain control over his seizures. Through the use of EEG Spectrum's neurofeedback software, the patient is trained using specially designed techniques that allow the patient to reach a state where equilibrium occurs when the synapses fire correctly.

The monitor allows the technician to see the brain wave activity and communicate to the patient during the treatment when the desired mental state is obtained. Many

forms of patient rewards are used during a treatment session. The two most common are game and auditory.

Through the use of the neurofeedback equipment, the clinician monitors body functions such as heart and pulse rate as well as anxiety level. The clinician applies relaxation techniques through computerized programs that combine pleasing visual and auditory sounds that reward the client when they have succeeded in lowering their anxiety. Once the client experiences the euphoria of relaxing to a state of normalcy over the course of several sessions, the client learns gradually how to reach the same state on their own.

Eventually, the client learns how to create the feeling desired, learning through operant conditioning how to obtain the state of relaxation without the direction of the technician. Changes in brain wave activity can be seen with the use of neurofeedback technology. Altering the electrical frequency of the neurons in the brain is the foundation of neurofeedback.

To compare the human brain to a computer, the problem occurs when the operating speed is not working properly. Othmer stated, "Some people can't find the gas pedal while some people can't take their foot off it" (as cited in Robbins, 1998, p. 3). Regaining homeostasis re-teaches

the electrical impulses how to fire the way they were originally intended.

While this procedure has also been used on children who are diagnosed with ADD and ADHD, critics have stated that neurofeedback is not the end to all means. Russell Barkley was quoted in Robbins (1998), stating "there's a tremendous placebo effect in a situation like this" as quoted in an article written by Jim Robbins (as cited in Robbins, 1998, p. 6).

Barkley (1993) has stated that scientific validity for EEG biofeedback must be established through the examination of controlled research and by double blind studies. Barkley also points out the possibility that treatment with children can very easily create a concern for power of suggestion. An article by Sean Weld states Barkley's opinion,

That while he acknowledges that no evidence exists that suggests that the treatment is harmful, he contends that the success claimed by the neurofeedback community is due largely to a placebo effect: reports of positive change by clients-particularly children - that are based on the power of suggestion. (Weld, 2001, p. 10)

Barkley as well as others who follow the traditional medical model of treatment believe that pharmaceuticals are the preferred choice simply because drug therapy has been the intervention for years in addition to being a

less costly form of treatment (Abarbanel, 1995). On the other end of the spectrum, Abarbanel, a Ph.D. and M.D. revealed that he feels neurofeedback can accomplish the same results as medication but from a holistic approach (Abarbanel, 1995). However, neurofeedback can be very costly.

At present, neurofeedback is not inexpensive and third party insurance companies do not always cover the cost. However, as more research proves that neurofeedback can correct conditions that were once considered to only be controlled with drugs, the medical and insurance companies will take notice. It was noted that medical methods should be used for up to 6 months after the initial trauma to give the brain a chance to recover as much as possible naturally. In some cases, a damaged brain can recover up to 80% of its functioning within six months following trauma (Hoffman et al., 1995). After the first six months, the medical community simply treats any malingering conditions with medication.

The patient often struggles with side effects associated with various drugs. In contrast, after traditional medical procedures have treated conditions such as depression and anxiety associated with emotional trauma, neurofeedback can continue to treat the residual

symptoms caused by childhood emotional trauma (EEG Spectrum International, 1999). Continuing to improve the malingered conditions can very well make the difference between the patient struggling with post trauma complications and being able to hold a job, have quality relationships and live a life with less pain and suffering.

Critical Review of Neurofeedback Research

As mentioned in the introduction to the literature review, an extensive amount of studies endorsing the positive effects of neurofeedback was found while little research was found divulging opposing views. While biofeedback is thought to be an innovative new technique for many ailments, critics have brought their concerns to the table. One such review of research on biofeedback stated, "Biofeedback research has lacked clear and appropriate conceptualizations and has lacked appropriate experimental design" (Matheson, Bruce, & Beauchamp, 1974, p. 1).

Although neurofeedback is used for many disorders, Barkley provides the social science community with an elaborate rebuttal on neurofeedback and ADHD. Russell Barkley, one of the world's leading researchers

specializing in attention deficit disorder, adamantly believes that neurofeedback as well as other treatment modalities that are not drug based, do not provide adequate results toward treatment. Barkley is quoted by Bob Brooks (1997) as stating "Unfortunately, to date no well controlled large group studies have been done to support the effectiveness of EEG biofeedback for ADHD children" (p. 2). Brooks also paraphrases Barkley as saying:

...studies that have been published report on only a relatively few cases and the effects of biofeedback were not clear since other interventions were taking place at the same time. So although we cannot rule out the possibility that EEG biofeedback training might be of some benefit, we cannot consider it a scientifically established effective treatment (p. 1).

Brooks reveals that Barkley and others "question the scientific rigor with which biofeedback has been tested for effectiveness" (Brooks, 1997, p. 1).

Another argument discusses 'category mistakes' in research. In the book, Introduction to Experimental Psychology the authors state:

In the initial investigation of new phenomena, category mistakes are likely because familiar conceptualizations appropriate to known phenomena are inaccurately applied. The category mistakes are often subtle and difficult to recognize because they appear to be correct. As attempts have been made to develop and

understand biofeedback training through research, category mistakes have been made that arise from faulty conceptualizations. (Matheson, Bruce, & Beauchamp, 1974, p. 5)

While neurofeedback is not accepted by all, one must be informed of past theories from which neurofeedback draws from.

Human Behavior in the Social Environment Theories Guiding Conceptualization

A foundational behavior theory roots neurofeedback treatment. Neurofeedback bases its principles on behavior modification through operant conditioning. Today, having knowledge in this theory is imperative to understand the new technological neurofeedback treatment.

Biofeedback, neurofeedback, relaxation techniques, imagery and other subcategories are encapsulated within the behavioral model. Pavlov's experiments contributed to the knowledge of anxiety disorders including learned helplessness and hyper-arousal, all of which is relevant in understanding childhood trauma effects. Behavior theory is often intertwined with cognitive therapy. Therefore, it is difficult to discuss one theory without the other. The healing process incorporates not only emotional changes but biological changes within the brain.

B.F. Skinner, father of behavioral theory was known for his radical behavioral technique of reinforcement. In the book, Clinical Social Work Practice, the author disclosed Skinner's theory that voluntary behavior, also known as operant conditioning, increases in frequency when reinforced positively (Cooper & Lesser, 2002,). Extinction, or the decrease of a behavior can also take place through reinforcement (Cooper & Lesser, 2002). In addition, behavior therapy focuses on the present not what occurred in the past. The behaviorist is mostly concerned with how their clients learn and how it affects their actions and behaviors. The therapist then goes on to help teach their client how to change their destructive patterns (Association for Advancement, 2000).

Summary

Chapter two summarized the literature pertinent to the study. Through the information given which included an understanding of biological effects of emotional trauma to the brain, the technical process of neurofeedback, conceptualization behind the theory, and criticism of the procedure, the background has been established for the critical review of neurofeedback.

Also, chapter two summarized one of society's ills and the social workers' role in treatment process. Neuroscience is the wave of the future. Therefore, professionals must place importance on awareness of opinions and attitudes on neurofeedback. More importantly, social workers should be knowledgeable of new procedures such as neurofeedback in order to be able to advocate for new technologies that enhance healing. Often it is the social worker/therapist who will have more contact with the patient over other professionals. Therefore, the social worker has the responsibility to educate the client on new techniques, advocate for coverage and direct the client to the resources.

CHAPTER THREE

METHODS

Introduction

Chapter three discusses the steps used in developing the project. In specific, the design of the research, the reasoning behind the methodological approach, and any limitations or implications pertinent to the study will be discussed. The research is investigating criticism of neurofeedback regardless of positive outcome depicted in past studies. Where does the opposition lay and what, if any, correlation could be implicated?

Study Design

The study was conducted to examine why there are opposing views on neurofeedback. While extensive studies have been done on outcomes of the procedure, little research was found on opposing views, and virtually no study was discovered that investigated the reasons for opposition. This study hypothesized that those professionals who opposed the treatment were from a specific professional background or were not knowledgeable enough on the subject.

Most professionals are taught one specific field of study. Medical doctors follow the theory under the

umbrella of osteopathy while psychologists focus on the function of the brain and its relationship to emotion.

Because past literature overwhelmingly states neurofeedback produces positive results, this research set out to explore why there is a difference of opinion in ordering neurofeedback treatment for patients.

Hypothesized in this report, individuals who are against neurofeedback took their stance either because of the etiology with which they were trained, or possibly for political or financial reasons such as incentives by pharmaceutical manufacturers.

The research was comprised of qualitative methodology. A survey was used to gather the respondent's information. It was imperative that demographic data was collected in order that correlations between varying attitudes could be determined by the subset of professionals within a geographic location. In addition to demographic questions, the participant was given the opportunity to provide lengthy in-depth statements through open-ended questions.

Open-ended queries were included to collect and later examine specific opinions about neurofeedback. Imperative was the need to distribute the questionnaire throughout a vast region.

Specialists in the area of neurofeedback are not necessarily found in large numbers in one region of the country. In order to attain a good sample, professionals from a vast area needed to be contacted. By distributing to experts in the healing field over the Internet, professionals from all across the country were solicited. The Internet afforded the researcher the ability to reach a widespread geographic area required to make the study valid. Difference of opinion from diverse areas within the United States, was collected. Attention was also given to confidentiality.

Distributing the survey over the Internet allowed the respondent a confidential means to provide opinions. However, as with all studies, there are possible ways that the confidentiality could have been intercepted. Care was taken to protect the confidentiality and identity of each respondent by assigning each participant an identification number. However, the study had its limitations as well.

Due to the nature of the research and the need to conduct the survey over the Internet, the researcher was dependent on the respondent to personally complete the survey and not allow office staff to answer the form. In addition, the survey needed to be sent out to a large number of specialists with the understanding that many

would not reply. It was projected that individuals who had a strong emotion toward the subject would respond at a greater frequency. Therefore, the data was expected to be extreme.

Sampling

Names of specialists were obtained from organizations, private schools and Universities and professional literature naming authors and experts in the field. The individuals solicited resided only within the United States.

A total of 563 surveys were electronically mailed via the Internet. The potential participants who fit the subset of the criteria came from the psychological or psychiatric/medical field, or they were professors, authors or pharmacists.

Data Collection and Instruments

Through the use of an Internet Survey Company named Hostedsurvey.com, qualitative data was collected and analyzed during the study. Survey questions were developed to provide insight into opinion. Hostedsurvey's software program allowed the researcher to send an invitation to participate (Appendix A), followed by an electronic consent form (Appendix B), the survey/questionnaire

(Appendix C) and a debriefing statement (Appendix D). The respondents were asked to electronically check off the consent form and email it back to the researcher.

The questions within the survey consisted of demographical inquiry followed by open-ended questions. It was imperative to gather personal information consisting of questions such as gender, cultural background, geographic location, years of knowledge with the subject matter, degrees held and current professions. Questions such as these were considered to possibly play a role in the participants' responses and opinions. Demographic questions were followed by qualitative inquiries.

In depth opinions were gathered through open-ended questions. Long answer queries included: familiarity with biofeedback/neurofeedback, respondent's cultural belief system in accordance to holistic or alternative healing, knowledge of neurofeedback techniques, the manner with which the respondent was educated on neurofeedback along with personal opinions about biofeedback/neurofeedback.

Respondents were given the opportunity to provide opinions on validity in addition to statements of opinion revealing 'for', 'against' or 'undecided/unknown' in referencing his or her opinions of neurofeedback. Each open-ended question provided the respondent the ability to

elaborate on their answers. Finally, an area was left at the bottom of the survey for the participant to provide an overall statement of opinion.

Once the respondent completed the survey, a debriefing statement followed. The study was descriptive in nature in that it was performed to produce greater knowledge on the subject.

Procedures

The researcher personally sent the surveys out over the Internet through electronic mail addresses found through researching web sites. Individuals fitting the criteria of the study who had their electronic mail addresses listed on the Internet either through Universities, private practice or advertisements were solicited.

The researcher input the electronic addresses into the Hostedsurvey software program. Five hundred and sixty three electronic mail addresses were entered into the software program. The potential participants were made up of 202 neurofeedback or biofeedback specialists, all of which had degrees in various other disciplines prior to becoming experts in neurofeedback or biofeedback. In addition to biofeedback/neurofeedback specialists, 3

psychiatrists, 55 psychologists, 14 medical doctors, 91 pharmacy professionals, 84 neurologists, and 114 professionals who were in other fields such as research, education, and neurobiology were sent invitations to participate in the study. Of the 563 invitations sent, 51 came back informing the researcher that the electronic mail addresses were obsolete. Important to note, the software used to distribute the survey, protected against double entry by the same respondent.

The software program automatically mailed each potential participant three times total over a ninety-day period. The survey began at the end of February 2002 and ended at the end of May 2002. Additionally, the program was developed to be user friendly toward the respondent. If the respondent wished to start the survey and finish it at a later date, the software allowed the participant to stop in the middle of the survey and get back into the program later. Respondents were asked to sign an informed consent before they participated and were told that they could stop at any time during the study.

Once the respondent completed the survey in its entirety, that participant no longer had access to the questionnaire. The software program only allowed one individual per electronic mail address to complete the

questionnaire. The survey was expected to take between ten to twenty minutes to complete.

Protection of Human Subjects

The confidentiality and anonymity of the study participants was a primary concern for this researcher and all efforts were made on her part to accomplish this. For sake of protecting the participants' anonymity, a numbering system was utilized. Once the respondent completed his or her survey, a debriefing statement with the names of the researcher and the advisor along with a contact phone numbers appeared.

Data Analysis

The analysis was conducted through the use of a computer program conducive to analyzing qualitative data. Contextual analysis was used for the study. It is important to note that the primary reason for the use of contextual analysis was to find, describe and conceptualize the subjective opinions.

Summary

The methods section disclosed information concerning the design of the study, sampling, procedures and protection of subjects in addition to a brief discussion on data analysis. Through the review of the information

given, this study can be replicated. The research project consisted of quantitative and qualitative questions that allowed each respondent an opportunity to disclose opinions in relation to neurofeedback. The information provided by each respondent was deciphered and analyzed by the researcher.

CHAPTER FOUR

RESULTS

Introduction

Chapter Four discusses the results of the research. Facts and information referencing pertinent details of the study are reviewed and presented in this chapter. Due to the qualitative nature of the study it was dictated that individuals who did not take part in the study had to be examined as well as those who participated. The Chapter concludes with a summary.

Study Participants

Originally, 39 individuals participated in the survey. Seven questionnaires were removed from the research due to incompleteness. The demographics of those participants removed from the study included: 2 neurofeedback specialists, 1 professor of neuroscience, 2 psychologists, 1 professor of neurology and 1 professor of pharmacy. Therefore, 32 professionals completed the questionnaire and comprised the study sample. The 32 respondents consisted of nineteen females and 13 males. Of the 32 respondents, 43.75% were between the ages of 51 through 60 (see Table 2 in Appendix E).

The survey allowed the respondents to check off more than one category when stating their specialization. Some participants were listed under more than one profession. There were 4 biofeedback specialists (12.50%), 4 biofeedback specialists (12.50%) 16 neurofeedback practitioners (50.00%), 12 psychologists (37.50%), 4 social workers and MFT's (12.50%), 11 professors (34.38%), 8 academics/researchers (25.81%), and 10 respondents listed as other (31.25%) (see Table 3 in Appendix E). Of the 4 biofeedback and 16 neurofeedback specialists, 11 held a master's degree in psychology, three had a master's or doctorate degree in education, 4 had a master's degree in social work, 1 was a registered nurse, and one individual held a Ph.D. in an undisclosed field.

The results were conclusive of the expectations of the researcher. The researcher anticipated that more biofeedback and neurofeedback specialists would be interested in the survey than professionals from other fields. The results showed that 20 (62.50%) out of the total 32 respondents who completed the survey specialized in neurofeedback.

Additionally, 39 electronic mail messages stating refusal to participate was received. The messages were

categorized into groups by profession. Six neurofeedback specialists, 10 neurobiologists, 3 researchers, 6 medical professors, 1 biophysics specialist, 7 pharmacology professors, 5 psychologists and 1 neurologist returned electronic messages informing the researcher of their refusal to participate. While some professionals informed the investigator of their lack of knowledge about neurofeedback, several adamantly stated they did not want any part of the study and provided no insight into opinion.

One can only speculate the lack of participation amongst professionals from other fields. Several messages from individuals refusing to participate informed the researcher that their unwillingness was due to lack of knowledge on the subject. These individuals stated they did not have anything to contribute to the research. It was expected that a professional would only recommend a treatment technique with which they were knowledgeable in.

Presentation of the Findings

Quantitative Questions

The quantitative responses are represented in three generated reports. Respondents were categorized after reviewing each survey in its entirety. Thus, each

participant was placed into one of three categories: of the total sample, 21 out of 32 (65.63%) consisting of 11 males and 10 females were 'for neurofeedback' (see Table 1 in Appendix F), 4 out of 32 (12.50%) consisting of all females were 'against neurofeedback' (see Table 1 in Appendix G) and 7 out of 32 (21.88%) comprised of 2 males and 5 females were 'undecided/unknown' (see Table 1 in Appendix H). Some of the questions included in the generated reports were comprised of gender, age and current profession.

Respondents were asked how many years of experience with biofeedback and/or neurofeedback did they have. In comparing the three generated reports, of all the respondents categorized as being 'for neurofeedback', (90.48%) had between 0 and 10 years knowledge of neurofeedback (see Table 6 of Appendix F). An additional 4.76% 'for' the procedure had up to 20 years of knowledge of neurofeedback (see Table 6 in Appendix F). Almost 30% of those 'for' the procedure had between 11 and 26+ years of biofeedback (the earlier treatment prior to neurofeedback) (see Table 5 in Appendix F) whereas 100% of those respondents 'against neurofeedback' had 5 years or less knowledge with both biofeedback and neurofeedback (see Tables 5 & 6 in Appendix G). Of those respondents

categorized as being 'undecided/unknown' all had 5 years or less knowledge with biofeedback and neurofeedback as well (see Tables 5 & 6 in Appendix H).

In referencing the question about the respondent's belief in disorders treatable through biofeedback or neurofeedback findings revealed that 89.66% of all respondents felt neurofeedback provided successful outcome for individuals with anxiety disorders (see Table 7 in Appendix E).

The respondents who were categorized as 'for neurofeedback' believed the procedure provided successful outcome for anxiety disorders, attention deficit disorders, seizure disorders, autism, addictions, trauma and anger management (see Table 7 in Appendix F) whereas those participants that were categorized as 'against' neurofeedback were more skeptical.

The participants categorized under 'against' neurofeedback stated that they felt the procedure was helpful in treating anxiety disorders, attention deficit disorders, addictions, trauma and anger control problems. Interesting, the respondents 'against' neurofeedback did not believe the procedure was successful in treating seizure disorders or autism (see Table 7 in Appendix G).

Included in the questionnaire, factors influencing opinions were requested. For the question of reason behind their opinion in relation to neurofeedbacks' reputation, 59.38% of all respondents stated that they felt the treatment was reputable (see Table 8 in Appendix E). Respondents further revealed that their views were influenced by various factors, 40.63% of the total sample felt the 'etiology learned within their specific field of study' influenced their belief while 34.38% of all respondents stated that 'literature read in journals' influenced their opinion about neurofeedbacks' reputability, 46.88% of the total sample reported that 'other' factors lead their belief system, and only 9.38% stated they didn't feel comfortable with the procedure and that they felt the 'research to date has been skewed through poor designs' (see Table 8 in Appendix E).

However, when comparing responses of those 'for neurofeedback' with those 'against', interesting data was revealed. Of those respondents 'for neurofeedback' 76.19% felt the treatment was reputable (see Table 8 in Appendix F), while only 25% of those 'against' neurofeedback felt the same way (see Table 8 in Appendix G). Respondents 'for' neurofeedback disclosed that their belief system was influenced by the 'etiology learned within their specific

field of study' (57.14%) while another 42.86% felt that literature read in journals had influenced their opinion (see Table 8 in Appendix F).

Individuals who were categorized as 'against' neurofeedback either felt the treatment was reputable (25%) or simply stated that factors not listed had influenced their opinion (25%) [see Table 8 in Appendix G]. It is interesting to note that participants categorized as 'against neurofeedback' did not specify the factors but simply stated that other influences had influenced their belief system (see Table 8 in Appendix G).

Of those respondents who were undecided/unknown 28.57% felt the treatment was reputable. However, an additional 28.57% felt that research on neurofeedback was skewed through poor designs. Furthermore, another 42.86% felt that not enough research had been done (see Table 8 in Appendix H).

Almost 47% of the study sample rated biofeedback and/or neurofeedback with the highest possible rating (10) on a scale of 1 to 10 (see Table 9 in Appendix E). While those participants who were categorized as being 'for' neurofeedback were overwhelmingly 'very satisfied' (61.90%) (see Table 9 in Appendix F), 50.00% of those

respondents who were against neurofeedback remained neutral and only 25.00% were 'very satisfied' (see Table 9 in Appendix G).

In reference to the question about personal experience being treated with biofeedback or neurofeedback, 43.75% of the study sample rated neurofeedback with the highest possible score, 10 on a scale of 1-10 (see Table 10 in Appendix E). Almost 62% of those participants 'for' neurofeedback stated that they personally have had the procedure done on themselves and were very satisfied rating a 10 on a scale of 1-10 (see Table 10 in Appendix F), while 25.00% of the respondents 'against' neurofeedback remained neutral (see Table 10 in Appendix G).

Qualitative Questions

In reviewing the open-ended opinion questions, the responses correlated with the results from the quantitative questions discussed earlier. While the majority of individuals who participated in the study were neurofeedback specialists, it was determined through statements provided by the respondents that 66% of the respondents gained knowledge of neurofeedback either from a course provided by EEG Spectrum or group training conferences.

Fifty-three percent of the respondents had knowledge in either neurofeedback or biofeedback, 31% of those who took the survey claimed no knowledge with the treatment and 16% did not provide any information or knowledge concerning the subject. Furthermore, when asked about belief systems, the respondents overwhelmingly agreed in two key areas.

Fifty percent of the respondents held the belief system that the "mind, body and spirit work together to heal." One respondent noted, "I recognize that there is an innate capacity for self-healing within humans that can be stimulated via a variety of procedures." Another respondent stated "I believe body and spirit have profound abilities to heal itself given the brain is in its optimum function."

Furthermore, while the majority of those participants who took the survey came from fields where the mind is incorporated in healing, several respondents who were pharmacists expressed the belief that "placebo effects" influence healing. One respondent adamantly said, "I believe in the power of suggestion and that the mind is linked to health and wellness." A pharmacist who took the survey stated "I am hypercritical of study methodology and

rely on systematic analysis of study quality to make such determinations."

Fifty percent of the respondents agreed that neurofeedback provides positive results. Some respondents provided past research information that backed up their positive opinion. One participant noted that "the Lubar and Thompson data is compelling." Another respondent stated, "I am more jaundiced in my view of the case studies since the clinician-effects may account for some of the outcome—yet I do think that a 100 case studies by varying clinicians add up to compelling evidence."

Sixty percent of the participants stated they felt neurofeedback treatment was both valid and reliable. Several respondents provided interesting statements about validity and reliability such as:

The fact that people keep coming in for treatment because their grades are going up or because they are sleeping better, or feel calmer-less anxious, no more migraines-chronic pain has eased-is anecdotal but a fact.

Another participant noted:

We see some external validation in various mapping studies whether QEEG, evoked spec. etc./ and in clinical practice when people unaware of the patient's treatment remark on notable changes in behavior, demeanor, expression, etc.

Only 3.13% gave biofeedback/neurofeedback a low rating (see Table 9 in Appendix E). The remaining

respondents either did not respond or expressed that their belief in scientific perspectives led to indecisiveness. One participant who had mixed feelings about neurofeedback stated:

I don't believe research will be the answer to gaining public knowledge of neurofeedback. Positive results, media attention and word of mouth are more productive venues.

The survey revealed interesting information in relation to success rates for specific disorders. Seventy percent of the respondents stated that neurofeedback is excellent in treating trauma patients. In reference to emotional trauma, respondents provided statements such as "I have seen sleep normalize with remission of nite terrors and vivid frightening dreams." Another participant reported, "Alpha training is by far the most useful technique. It is most useful when integrated with psychotherapy."

When asked if there were some conditions which neurofeedback did not improve, the respondents provided some enlightening information. Interestingly, two participants stated that those clients who do not take care of their health overall often do not improve. As stated by one respondent: "Persons with ongoing overwhelming stressors (abusive partner, parent, boss)

poor nutrition, toxic exposure etc." When referencing those who don't improve from treatment. Another participant provided an interesting perspective; "Some people aren't ready to let go their symptoms—getting secondary gain. Client needs to make lifestyle changes."

It was also noted that neurofeedback treatment does not always provide noticeable improvement when the specialist uses the same treatment technique on all patients without taking into account the specific condition being treated. Several respondents were quick to state that some neurofeedback specialists are in need of additional training in order to personalize the treatment plan for the specific disorder. One participant stated:

The success depends upon who is providing the service and how the process is accomplished; a lack of flexibility in intervention is probably the primary reason clients do not progress.

Additionally, respondents also noted disorders that could not be improved with neurofeedback. One respondent stated:

Some types of seizure disorders/severe head trauma; that may still see some positive effects; also persons with chronic pain showing excessive Alpha at Cz- who have often undiagnosed blood infection/parasitic infection which needs to be treated in order to allow neurofeedback effects to stick.

Other respondents felt that structural disorders, chronic pain, bipolar disorder, obsessive compulsive disorder as well as severe hypertension and cancer were some conditions that do not respond to neurofeedback. One respondent mentioned that there are some learning disorders, not including ADD or ADHD that cannot be helped through neurofeedback. One individual commented that there are those "learning conditions that are less responsive than ADD/ADHD."

With regards to insurance coverage, an overwhelming 73% of respondents felt that neurofeedback should be covered by insurance. Cost effectiveness was the primary reason why many of the participants felt insurance coverage should exist. Statements from respondents relayed feelings that:

It is just as effective as medication and more so in many cases. It is also a useful adjunct to medication in some cases where neither alone is sufficient. It is clearly a friend to insurance companies because it will save them money too!.

Another participant stated that the treatment is good "for the ADHD population, it is as effective as medication without the side effects that some people experience, and impacts more areas of functioning."

Those opposing neurofeedback provided different views. Seventeen percent of the study sample felt

insurance companies should not cover the treatment. The reasoning for their rationale was interesting. One pharmacist wrote, "I believe they should provide coverage for a limited number and type of services." Responses from participants also disclosed opinions that they felt insurance companies and drug companies would be against neurofeedback. This was evidenced by the comment "drug companies do not want to see this happen so I expect a hard lobby to continue against neurofeedback." Another pharmacist wrote,

We don't have the money to spend on hearsay and anecdotes. Until there is solid evidence to support its use published in respected peer reviewed journals—otherwise we are spending health care dollars on unsubstantiated reports when we could be spending on techniques shown to be effective.

Yet another professional in the pharmaceuticals revealed that when it comes to insurance coverage he/she felt,

It depends on what requires sacrifice from other healthcare resources. As it is, people with chronic illness often do not have access to appropriate therapies with recognized benefits. Participants must also pay their fair share of their benefits (insurance companies and employers paying premiums do not have unlimited resources).

Ten percent of the participants were either undecided or did not have enough knowledge to state opinions about

insurance coverage. The statements provided by these respondents presented a theme that revealed a connection between lack of knowledge about neurofeedback and negative opinion.

It was apparent by examining the responses of each participant that those respondents who came from disciplines not familiar with neurofeedback leaned toward the opinion that the procedure did not have enough research done to rule out placebo effects. In examining participants' statements, it was apparent that professionals in fields in the academic/research and other specialties such as pharmacy felt more studies should be done on the treatment (42.86%) [see Table 8 Appendix G].

One respondent who is knowledgeable with neurofeedback wrote, "Anyone who would say they are against it, is probably not very knowledgeable about it." A respondent against neurofeedback wrote, "It is necessary to remain questioning until studies with large samples, control treatment, arms and blind as possible" were required before the procedure could be given validity. Yet another pharmacist commented,

This is a +/- area. I have no idea if there is a 'license' required or who would accredit, I suspect no so there is a real possibility of fraud.

When comparing comments by professionals using neurofeedback with those individuals not familiar with the treatment, participants who had little knowledge about neurofeedback tended to lean against the procedure. Specialists in neurofeedback stated that they were skeptical of the treatment when first learning about it. Therefore, perhaps exposure to the subject and witnessing treatment outcome could result in change of opinion.

The questionnaire asked each respondent if his or her opinion about neurofeedback had changed at anytime. One hundred percent of those who answered the question revealed that skepticism was very high when first learning about the procedure. There were responses such as "if anything, I went from a skeptic to a believer after seeing it for myself" and

I used to think neurofeedback was not effective. From my early days in neurofeedback, my experience was not positive due to poor quality equipment and lack of understanding of what constitutes an approach intervention. When I returned to neurofeedback in 1992, I remained skeptical for a year until results (showed better signs).

Therefore, it seems that as knowledge was attained and experience was gained in witnessing the outcome of neurofeedback, the participants changed their views about the procedure.

Summary

Chapter Four examined personal opinions that were disclosed through the study. Common themes were consistent with prior literature review. Prior studies reported that specialists practicing the procedure have been more vocal about the treatment and professionals from other fields do not express their opinions as actively about neurofeedback.

In this study, it was also found that those individuals who expressed a need for more research did not have in depth knowledge of the procedure. Therefore, it seems that skepticism is simply due to lack of knowledge.

CHAPTER FIVE

DISCUSSION

Introduction

Included in Chapter Five was a presentation of the study as a result of completing the project. Recommendations determined through review of the facts are presented. The research limitations and potential fallacies within the study were examined. Suggestions for future research were included. Lastly, the Chapter concludes with a summary.

Discussion

First, it was imperative to mention the necessity to examine some demographics of the individuals who took the survey and those who refused to participate in the study. Because the research investigated opinions and attitudes, it was interesting to compare the professions of those who refused and participated.

While a larger percentage of professionals from fields that treat with techniques other than neurofeedback were solicited, the sample showed that very few took part in the survey in comparison to those who specialized in neurofeedback. Many of those professionals educated in neurology, biology, medicine and pharmacology did not

participate in the study. While some stated that they would not have anything to offer, many simply refused. Seven individuals from these same professions started the survey only to stop answering the questions in the qualitative section.

One can hypothesize that many professionals from the fields of medicine, neurology and pharmacy would have a difficult time referring a patient for neurofeedback treatment due to lack of knowledge. Therefore, the professionals who participated in the study consisted of a unique subset of individuals.

Findings

Despite attempts made by the researcher, the results of the study found that professionals from fields not familiar with biofeedback or neurofeedback had a small response rate. Only 4 respondents comprised of all females provided an overall negative opinion about the procedure.

Results of the study seemed to coincide with past findings in the literature review. Therefore, many publications expressing positive views about biofeedback and neurofeedback were found while there were few studies that reported a negative opinion. This research study found that professionals knowledgeable in biofeedback

and/or neurofeedback were more vocal in relation to opinions on the subject matter than those not familiar with the treatment procedure.

As expected, overall opinions gathered from the survey found that many professionals who embrace mind and body connection in relation to healing tended to have a positive outlook on the procedure. Those specialists whose primarily focus on the biological aspects of healing tended to convey a negative opinion or remained neutral.

From the quantitative data, those respondents with more years of knowledge and experience with biofeedback and/or neurofeedback were 'for' the procedure, while individuals with little knowledge were either 'against' or 'undecided'.

All respondents 'for' biofeedback and/or neurofeedback stated that they were skeptical of the procedure when first learning about it. However, as they gained knowledge, their opinions changed from skepticism to a strong belief that the procedure is successful. Therefore, it can be deducted that if those respondents who were 'against' or 'undecided' were provided with additional information or given the chance to witness outcome of treatment, they too may move from skepticism to belief.

Respondents were asked to rate various disorders and potential success from biofeedback and/or neurofeedback. An overwhelming 90% of all respondents felt that biofeedback and/or neurofeedback is most successful in treating anxiety disorders. It is important to note that respondents categorized as 'against' the procedure expressed the opinion that biofeedback/neurofeedback does not provide positive outcome for seizure disorders or autism.

One hundred percent of the respondents 'against' neurofeedback believed the treatment was good for addictions, anger management and anxiety but none of them felt the procedure would help with structural disorders such as seizures and autism.

The respondents were also asked to rate the reputability of biofeedback and neurofeedback. Seventy percent of all respondents disclosed that they felt biofeedback and/or neurofeedback was reputable. Forty eight percent of the participants stated that the methods taught within their field of study had influenced their opinions. Interesting, 11% of respondents disclosed that they weren't comfortable with biofeedback or neurofeedback and felt that research to date was skewed through poor design.

Finally, participants were given the opportunity to provide an overall success rating for the procedure. The results showed that of the study sample, 50% were very satisfied with biofeedback and/or neurofeedback. Sixty five percent of the respondents 'for' the procedure stated they were very satisfied with the treatment. Sixty seven percent of those 'against' biofeedback/neurofeedback were neutral about the procedure. Those individuals 'undecided/unknown' also felt neutral. Examination of open-ended questions revealed the potential reason why those 'for' the procedure did not give higher marks.

Specialists in the field of neurofeedback stated that outcome of treatment is often determined by the skill of the practitioner. It was revealed that there are some professionals providing neurofeedback treatment who use one or two treatment methods on all patients regardless of diagnosis. Therefore, one could hypothesize that the practitioner's lack of knowledge and experience could affect outcome of procedure, thus opening a door for skepticism.

Limitations

Limitations of the study could have affected the outcome. First, it was evident that the findings could

have been biased due to the conclusion of a particular subset of individuals. For this study, only those professionals who have Internet access were included. This excluded a large group of professionals who are not listed on the Internet. Individuals who do not rely on the Internet may have a different opinion toward computerized technology. Therefore, it is possible that there were many professionals not accessible to the researcher that could have contributed to the research questions.

Another limitation was the search for electronic mail addresses for professionals who fit the criteria of the study. The rate for participation of University Professors was low. Those professors who did not participate could have been privy to vital information that could have contributed to the study.

Additionally, professionals who have written about biofeedback and/or neurofeedback were difficult to locate on the Internet. While their publications were found, their electronic mail addresses were much more difficult to locate. Therefore, there was a low number of professionals known to write critical commentary about the subject in the study sample. Findings may have been different if these professionals had been included. It was discovered that professionals from fields of study other

than biofeedback or neurofeedback would not even consider taking the survey. Many professionals specializing in neurology, pharmacology and biology, stated that they would not participate because the subject was not in their field of expertise. Perhaps the invitation could have been written in such a way that would have been more attractive.

Other limitations existed due to misconceptions of the study questions. One of the questions was misconstrued by most of the respondents. The researcher was interested in cultural belief systems learned from early childhood and how it could have affected respondents' opinions. The intent was to examine how cultural values and ethnicity could have played a role in opinions about holistic healing. Native Americans, Chinese and individuals from India are often known to hold specific views about alternative ways to treat. However, most respondents did not understand the question and provided statements of opinion that did not answer the question.

Most participants discussed their belief in alternative medicine from a western perspective. While the information the researcher was hoping to accumulate was not collected, interesting data was obtained from this question. However, if the question were re-worded and

understood in the context with which it was intended, the study's results would be enriched.

Finally, because the research did not attract more professionals from disciplines other than specialists in biofeedback or neurofeedback, the researcher could only speculate on the possible reasons of those who refused to take the survey.

Recommendations for Social Work Practice and Research

The social work profession incorporates an eclectic approach to treatment. Professionals in this field as well as other helping professions have a responsibility to be knowledgeable about many methods of treatment. While biofeedback and neurofeedback fall under the umbrella of behavioral psychology, the social worker can easily incorporate this approach in his or her treatment approach.

Specific recommendations include: one, social workers to learn more about the treatment procedure in order to use or refer clients for neurofeedback therapy, two, more study on outcome of neurofeedback for specific disorders. Third, future studies examining opinions held by health insurance companies would provide valuable information for the inclusion of neurofeedback in insurance coverage.

While it is expected that insurance companies would hesitate integrating another procedure not currently covered, treatment protocol could change by the funding provided by insurance involvement.

While past research on the outcome of biofeedback and neurofeedback is extensive, and some articles were found opposing the procedure, this study was done to examine opinions between professionals from different fields. The primary focus of the study was to investigate possible reasons for the difference of opinion.

Conclusions

The conclusions extracted from the project followed closely with previous literature review. Just as investigation of previous literature divulged extensive articles written in favor of biofeedback and/or neurofeedback and little was found opposing the procedure, this study revealed similar results. Professionals with positive views about the subject were more vocal than those opposing biofeedback and neurofeedback. However, the in depth questions allowed the researcher potential insight into possible reasons for skepticism.

Several specialists in the field of neurofeedback revealed possible reasons why this procedure in particular

may not always have noticeable outcome. Because some neurofeedback specialists use the computerized equipment in a limited capacity, some clients are not receiving a personalized treatment regime matching their disorder.

Experienced neurofeedback specialists revealed a possible cause for skepticism with the treatment. One can hypothesize that lack of knowledge and experience in relation to different ways to treat with the neurofeedback equipment may result in skepticism amongst those who are watching from afar. Therefore, the solution would involve enhanced training that would incorporate several treatment methods prior to receiving certification to treat with neurofeedback.

Additionally, several professionals from opposing views state that neurofeedback could not improve structural disorders. These specialists also revealed overall lack of knowledge about neurofeedback. This researcher would argue that brief informational lectures at conventions and conferences attended by neurologists, doctors, pharmacists and psychologists would help these professionals learn more about the effectiveness of neurofeedback. Just as interagency meetings are attended by social workers and other professionals in similar fields with the intent of sharing resources, specialists

from fields known to oppose neurofeedback could benefit from similar venues.

Suggestions and thoughts were provided by respondents to enhance future research. One participant stated:

research in any new field has to be done with clinical sensitivity and with clinical experience, not just a mechanical, protocol driven way. Perhaps a study that looks at the results by the clinicians who are using neurofeedback daily would help to establish that it is indeed useful.

Another respondent said "I do think more research needs to be conducted...lets see some big drug company do a comparison study with medications and pay for the study."

Finally, this research provided valuable information that should be examined by several persons and agencies. While many of the findings were expected, there were interesting facts that surfaced as well. Potential reasons for skepticism were revealed. It was determined that discrepancy of opinion existed due to inconsistency of treatment outcome. Suggestions were made to alleviate the cause behind neurofeedback's lack of acceptance. This researcher hopes that this study will contribute to the professional community in order to expand investigation into similar venues that will enhance healing for those in need.

APPENDIX A
INVITATION TO TAKE THE SURVEY

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

Hello! Allow me to introduce myself: Susan Anthes, Graduate Student, California State University, San Bernardino. Currently, I am conducting a study/research project on Biofeedback and Neurofeedback. I obtained your contact information from various sources: Internet sites, journal articles or professional organizations. All information obtained through this research is confidential. Your valued opinions will only require ten to twenty minutes of your time. The following 25 questions will focus on your opinion on Biofeedback and Neurofeedback. In participating in this research, you are agreeing to the terms and conditions as stated on the informed consent provided. Your participation is greatly appreciated.

Thank you
Susan A. Anthes
santh59@msn.com

APPENDIX B
INFORMED CONSENT

INFORMED CONSENT

I, _____ agree to take part in the research titled "Neurofeedback Results: A Critical Cross Comparison Of Opinion Within The Profession" conducted by Susan A. Anthes, MSW student at California State University San Bernardino, under the supervision of Dr. Trang Hoang, Faculty Supervisor at California State University San Bernardino. I understand that I do not have to participate if I do not want to. I can stop taking part in the study for any reason, and without penalty. I can ask to have all information about me returned, removed from the research records, or destroyed. If I volunteer to participate in this study, I will be asked to complete the survey in full to the best of my ability and provide in depth answers due to the nature of the qualitative study. No information provided about me during the research will be shared with others without my written permission. I will be assigned an identifying number and this number will be matched to the survey that I complete. My name will not appear on any forms. The Department of Social Work Sub-Committee of the Institutional Review Board at California State University, San Bernardino, has approved this study. The researcher will answer any further questions about the study, either by electronic mail or in person at any time during the research. If you have any other questions or concerns about the study, contact Dr. Trang Hoang at the Department of Social Work at California State University San Bernardino at (909) 880-5559, or by electronic mail, thoang@csusb.edu I understand that I am agreeing by my electronically typed signature on this form to take part in this research project and I further acknowledge that I can make a copy of this consent form from the Internet.

Thank you for taking part in this study.

Susan A. Anthes February 22, 2002

Signature of Researcher Date

Please check _____ Date _____
and e-mail this page back to me.

Questions or problems regarding your rights as a participant should be addressed to the Institutional Review Board, California State University San Bernardino, Telephone number (909) 880-5027.

APPENDIX C
SURVEY QUESTIONNAIRE

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

What is your gender?

- male
- female

What is your age?

- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 80 +

What is your Nationality/Ethnicity?

What degrees do you hold?

What is your current profession? (check all that apply)

- Biofeedback specialist
- Neurofeedback specialist
- Psychiatrist
- Psychologist
- LCSW, MSW or MFT
- Professor
- Academics/ Researcher
- Other

What do you specialize in? (check all that apply)

- Biofeedback
- Neurofeedback
- Psychiatry
- Psychology
- Psychotherapy
- Research
- Academics
- Other

How many years of biofeedback knowledge do you have?

- 0 - 5
- 6 - 10
- 11 - 20
- 21 - 25
- 26 +

How many years of neurofeedback knowledge do you have?

- 0 - 5
- 6 - 10
- 11 - 20
- 21 - 25
- 26 +

What City and State do you currently practice or work in?

PLEASE LIMIT YOUR ANSWERS TO FOUR PARAGRAPHS OR LESS FOR QUESTIONS 10 THROUGH 16.

TEST MODE

Submit

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

How familiar are you with Neurofeedback? Please state how you gained your knowledge about the technique?

	
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Please indicate what area your primary knowledge of the subject is in, Biofeedback, Neurofeedback or both?

	
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What are your cultures and/or belief system in accordance with holistic or alternative healing?

	
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Are you in agreement with research done on Biofeedback and Neurofeedback that state positive results from the treatment? If not, why?

	
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Do you believe that Biofeedback and/or Neurofeedback results are valid and reliable? Please give a brief explanation to back up your response.

	
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Do you believe that Biofeedback and/or Neurofeedback provides successful results specifically for psychologically traumatized patients? Please explain your response.

	
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Please discuss any knowledge that you have on the use of Biofeedback and/or Neurofeedback in the treatment of trauma patients.

Please check off the conditions that you believe that Biofeedback and/or Neurofeedback therapy is successful in treating? Check all that apply.

- Anxiety disorders
- Attention deficit disorders
- Seizure disorders
- Autism
- Addictions
- Trauma
- Anger management
- Other
- All of the above

PLEASE LIMIT YOUR ANSWERS FOR QUESTIONS 18 THROUGH 22 TO FOUR PARAGRAPHS OR LESS.

If you believe that Biofeedback and/or Neurofeedback is a successful form of treatment for some disorders but not others, please list and explain your rationale for those conditions you feel the procedure does not have a successful outcome.

TEST MODE

Submit

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

At any time, has your opinion about Biofeedback or Neurofeedback changed from one position to an opposing opinion. Please explain your response.

	 <small>Survey icon</small>
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Do you believe that insurance companies should provide coverage for Biofeedback and/or Neurofeedback? Please give a brief explanation to back up your response.

	 <small>Survey icon</small>
--	---

If you do not believe that Biofeedback and/or Neurofeedback is a reputable form of treatment, please state why and discuss your reasoning.

	 <small>Survey icon</small>
--	---

What factors influenced your opinion on whether or not Biofeedback and/or Neurofeedback is a reputable form of treatment? Check all that apply.

- I feel the treatment is reputable
- Etiology learned within my specific field of study.
- Insurance company reimbursement
- It does not fit into the medical model or other known models of treatment.
- I do not yet feel comfortable with the procedure because not enough research has been done.
- I feel the research to date has been skewed through poor designs.
- My opinion has been based on literature read in journals.
- Other

How would you rate Biofeedback and/or Neurofeedback as a successful treatment plan overall?

Very dissatisfied Very satisfied

Neutral

If you have personally been treated with Biofeedback or Neurofeedback, please rate how successful the outcome was for you. If you have never had the treatment, skip to next question.

Very dissatisfied Very satisfied

Neutral

Please provide any additional information that you feel would be helpful to this research.

TEST MODE

Submit

APPENDIX D
DEBRIEFING STATEMENT

DEBRIEFING STATEMENT

You have just completed the research titled, "Neurofeedback Results: A Critical Cross Comparison Of Opinion Within The Profession" conducted by Susan A. Anthes, Master's Social Work student at California State University San Bernardino under the supervision of Dr. Trang Hoang. You were asked to complete a quantitative/qualitative survey, stating your opinions including any criticism on the subject of Biofeedback/Neurofeedback results. Neurofeedback is relatively a new holistic form of treatment. Many studies were found on positive outcomes from the procedure. Criticism of the treatment was revealed in the literature as well. However, virtually no research was found on the reasons for the difference of opinion.

The research was conducted with the intent to bring additional insight and understanding of opinions and attitudes within the professional community on the technique. The study is investigative in nature and is looking for any connection to attitudinal opinions. The results of this study will be available in the California State University Pfau library after summer of 2002. For additional information on the results of this study or any questions regarding the research, call Dr. Trang Hoang at California State University San Bernardino, Social Work Department at (909) 880-5559.

Thank you for your participation.

Susan A. Anthes, February 22, 2002
santh59@msn.com

APPENDIX E
OVERALL REPORT

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

Overview Report Table

1	What is your gender?	COUNT	PCT	0%	50%	100%
	male	13	40.63%		40.63%	
	female	19	59.38%		59.38%	
	Total	32	100.00%			

2	What is your age?	COUNT	PCT	0%	50%	100%
	21 - 30	2	6.25%		6.25%	
	31 - 40	7	21.88%		21.88%	
	41 - 50	7	21.88%		21.88%	
	51 - 60	14	43.75%		43.75%	
	61 - 70	2	6.25%		6.25%	
	71 - 80	0	0.00%		0.00%	
	80 +	0	0.00%		0.00%	
	Total	32	100.00%			

3	What is your current profession? (check all that apply)	COUNT	PCT	0%	50%	100%
	Biofeedback specialist	4	12.50%		12.50%	
	Neurofeedback specialist	16	50.00%		50.00%	
	Psychiatrist	0	0.00%		0.00%	
	Psychologist	12	37.50%		37.50%	
	LCSW, MSW or MFT	4	12.50%		12.50%	
	Professor	11	34.38%		34.38%	
	Academics/ Researcher	8	25.00%		25.00%	
	Other	10	31.25%		31.25%	
	Total Respondents	32	100.00%			

4	What do you specialize in? (check all that apply)	COUNT	PCT	0%	50%	100%
	Biofeedback	5	15.63%		15.63%	
	Neurofeedback	20	62.50%		62.50%	
	Psychiatry	0	0.00%		0.00%	
	Psychology	8	25.00%		25.00%	
	Psychotherapy	10	31.25%		31.25%	
	Research	5	15.63%		15.63%	
	Academics	8	25.00%		25.00%	
	Other	11	34.38%		34.38%	
	Total Respondents	32				

5	How many years of biofeedback knowledge do you have?	COUNT	PCT	0%	50%	100%
	0 - 5	19	59.38%		59.38%	
	6 - 10	6	18.75%		18.75%	
	11 - 20	2	6.25%		6.25%	
	21 - 25	3	9.38%		9.38%	
	26 +	1	3.13%		3.13%	
	Total	32				

6	How many years of neurofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	21	65.63%			65.63%
	6 - 10	9	28.13%		28.33%	
	11 - 20	1	3.13%	3.13%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	32				

7	Please check off the conditions that you believe that Biofeedback and/or Neurofeedback therapy is successful in treating? Check all that apply.	COUNT	PCT.	0%	50%	100%
	Anxiety disorders	26	81.25%			81.25%
	Attention deficit disorders	19	59.38%			59.38%
	Seizure disorders	18	9.00%	9.00%		
	Autism	14	43.75%		43.75%	
	Addictions	19	59.38%			59.38%
	Trauma	18	56.25%			56.25%
	Anger management	23	71.88%			71.88%
	Other	18	56.25%			56.25%
	All of the above	15	46.88%			46.88%
	Total Respondents	32				

8	What factors influenced your opinion on whether or not Biofeedback and/or Neurofeedback is a reputable form of treatment? Check all that apply.	COUNT	PCT.	0%	50%	100%
	I feel the treatment is reputable	19	59.38%			59.38%
	Etiology learned within my specific field of study.	13	40.63%			40.63%
	Insurance company reimbursement	4	12.50%		12.50%	
	Doesn't fit into the medical model or other known models of treatment.	0	0.00%	0.00%		
	Don't feel comfortable with procedure: not enough research done.	3	9.38%		9.38%	
	I feel the research to date has been skewed through poor designs.	3	9.38%		9.38%	
	My opinion has been based on literature read in journals.	11	34.38%			34.38%
	Other	15	46.88%			46.88%
	Total Respondents	32				

9	How would you rate Biofeedback and/or Neurofeedback as a successful treatment plan overall?	COUNT	PCT.	0%	50%	100%
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	1	3.13%	3.13%		
	4	0	0.00%	0.00%		
	5 Neutral	6	18.75%			18.75%
	6	0	0.00%	0.00%		
	7	3	9.38%		9.38%	
	8	2	6.25%		6.25%	
	9	3	9.38%		9.38%	
	10 Very satisfied	15	46.88%			46.88%
	Total	32				
	Average					

10	If you have personally been treated with Biofeedback or Neurofeedback, please rate how successful the outcome was for you. If you have never had the treatment, skip to next question.	COUNT	PCT.	0% 50% 100%		
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	0	0.00%	0.00%		
	4	0	0.00%	0.00%		
	5 Neutral	1	3.13%	3.13%		
	6	0	0.00%	0.00%		
	7	2	6.25%	6.25%		
	8	0	0.00%	0.00%		
	9	3	9.38%	9.38%		
	10 Very satisfied	14	43.75%	43.75%		
	Total	32				
	Average					

APPENDIX F
RESPONDENTS WHO ARE FOR
NEUROFEEDBACK

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

Respondents For Neurofeedback Table

1	What is your gender?	COUNT	PCT.	0%	50%	100%
	male	11	52.38%		52.38%	
	female	10	47.62%		47.62%	
	Total	21	100.00%			

2	What is your age?	COUNT	PCT.	0%	50%	100%
	21 - 30	0	0.00%			
	31 - 40	2	9.52%			
	41 - 50	6	28.57%			
	51 - 60	11	52.38%			
	61 - 70	2	9.52%			
	71 - 80	0	0.00%			
	80 +	0	0.00%			
	Total	21	100.00%			

3	What is your current profession? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback specialist	4	19.05%			
	Neurofeedback specialist	15	71.43%			
	Psychiatrist	0	0.00%			
	Psychologist	10	47.62%			
	LCSW, MSW or MFT	4	19.05%			
	Professor	2	9.52%			
	Academics/ Researcher	2	9.52%			
	Other	5	23.81%			
	Total Respondents	21				

4	What do you specialize in? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback	5	23.81%			
	Neurofeedback	19	90.48%			
	Psychiatry	0	0.00%			
	Psychology	7	33.33%			
	Psychotherapy	10	47.62%			
	Research	2	9.52%			
	Academics	2	9.52%			
	Other	4	19.05%			
	Total Respondents	21				

5	How many years of biofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	8	38.10%			
	6 - 10	6	28.57%			
	11 - 20	2	9.52%			
	21 - 25	3	14.29%			
	26 +	1	4.76%			
	Total	21				

6	How many years of neurofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	10	47.62%		38.10%	
	6 - 10	9	42.86%		42.86%	
	11 - 20	1	4.76%	4.76%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	21				

7	Please check off the conditions that you believe that Biofeedback and/or Neurofeedback therapy is successful in treating? Check all that apply.	COUNT	PCT.	0%	50%	100%
	Anxiety disorders	19	90.48%			48%
	Attention deficit disorders	18	85.71%			85.71%
	Seizure disorders	17	80.95%			80.95%
	Autism	14	66.67%			66.67%
	Addictions	15	71.43%			71.43%
	Trauma	15	71.43%			71.43%
	Anger management	18	85.71%			85.71%
	Other	15	71.43%			71.43%
	All of the above	14	66.67%			66.67%
	Total Respondents	21				

8	What factors influenced your opinion on whether or not Biofeedback and/or Neurofeedback is a reputable form of treatment? Check all that apply.	COUNT	PCT.	0%	50%	100%
	I feel the treatment is reputable	16	76.19%			76.19%
	Etiology learned within my specific field of study.	12	57.14%		57.14%	
	Insurance company reimbursement	3	14.29%	14.29%		
	Doesn't fit into the medical model or other known models of treatment.	0	0.00%	0.00%		
	Don't feel comfortable with procedure; not enough research done.	0	0.00%	0.00%		
	I feel the research to date has been skewed through poor designs.	1	4.76%	4.76%		
	My opinion has been based on literature read in journals.	9	42.86%		42.86%	
	Other	12	57.14%		57.14%	
	Total Respondents	21				

9	How would you rate Biofeedback and/or Neurofeedback as a successful treatment plan overall?	COUNT	PCT.	0%	50%	100%
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	0	0.00%	0.00%		
	4	0	0.00%	0.00%		
	5 Neutral	1	4.76%	4.76%		
	6	0	0.00%	0.00%		
	7	1	4.76%	4.76%		
	8	2	9.52%	9.52%		
	9	3	14.29%	14.29%		
	10 Very satisfied	13	61.90%			61.90%
	Total	21				
	Average					

10	If you have personally been treated with Biofeedback or Neurofeedback, please rate how successful the outcome was for you. If you have never had the treatment, skip to next question.	COUNT	PCT.	0% 50% 100%			
	1 Very dissatisfied	0	0.00%	0.00%			
	2	0	0.00%	0.00%			
	3	0	0.00%	0.00%			
	4	0	0.00%	0.00%			
	5 Neutral	0	0.00%	0.00%			
	6	0	0.00%	0.00%			
	7	1	4.76%	4.76%			
	8	0	0.00%	0.00%			
	9	3	14.29%	14.29%			
	10 Very satisfied	13	61.90%	61.90%			
	Total	21					
	Average						

APPENDIX G
RESPONDENTS WHO ARE AGAINST
NEUROFEEDBACK

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

Respondents Against Neurofeedback

Table

1	What is your gender?	COUNT	PCT.	0%	50%	100%
	Male	0	0.00%	0.00%		
	Female	4	100.00%			
	Total	4	100.00%			

2	What is your age?	COUNT	PCT.	0%	50%	100%
	21 - 30	1	25.00%		25.00%	
	31 - 40	2	50.00%			50.00%
	41 - 50	1	25.00%		25.00%	
	51 - 60	0	0.00%	0.00%		
	61 - 70	0	0.00%	0.00%		
	71 - 80	0	0.00%	0.00%		
	80 +	0	0.00%	0.00%		
	Total	4	100.00%			

3	What is your current profession? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback specialist	0	0.00%	0.00%		
	Neurofeedback specialist	0	0.00%	0.00%		
	Psychiatrist	0	0.00%	0.00%		
	Psychologist	1	25.00%		25.00%	
	LCSW, MSW or MFT	0	0.00%	0.00%		
	Professor	3	75.00%			75.00%
	Academics/ Researcher	3	75.00%			75.00%
	Other	1	25.00%		25.00%	
	Total Respondents	4				

4	What do you specialize in? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback	0	0.00%	0.00%		
	Neurofeedback	0	0.00%	0.00%		
	Psychiatry	0	0.00%	0.00%		
	Psychology	1	25.00%		25.00%	
	Psychotherapy	0	0.00%	0.00%		
	Research	2	50.00%			50.00%
	Academics	3	75.00%			75.00%
	Other	2	50.00%			50.00%
	Total Respondents	4				

5	How many years of biofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	4	100.00%			
	6 - 10	0	0.00%	0.00%		
	11 - 20	0	0.00%	0.00%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	4	100.00%			

6	How many years of neurofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	4	100.00%			
	6 - 10	0	0.00%	0.00%		
	11 - 20	0	0.00%	0.00%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	4	100.00%			

7	Please check off the conditions that you believe that Biofeedback and/or Neurofeedback therapy is successful in treating? Check all that apply.	COUNT	PCT.	0%	50%	100%
	Anxiety disorders	2	50.00%		50.00%	
	Attention deficit disorders	1	25.00%		25.00%	
	Seizure disorders	0	0.00%	0.00%		
	Autism	0	0.00%	0.00%		
	Addictions	2	50.00%		50.00%	
	Trauma	1	25.00%		25.00%	
	Anger management	2	50.00%		50.00%	
	Other	1	25.00%		25.00%	
	All of the above	0	0.00%	0.00%		
	Total Respondents	4				

8	What factors influenced your opinion on whether or not Biofeedback and/or Neurofeedback is a reputable form of treatment? Check all that apply.	COUNT	PCT.	0%	50%	100%
	I feel the treatment is reputable	1	25.00%		25.00%	
	Etiology learned within my specific field of study.	0	0.00%	0.00%		
	Insurance company reimbursement	0	0.00%	0.00%		
	Doesn't fit into the medical model or other known models of treatment.	0	0.00%	0.00%		
	Don't feel comfortable with procedure: not enough research done.	0	0.00%	0.00%		
	I feel the research to date has been skewed through poor designs.	0	0.00%	0.00%		
	My opinion has been based on literature read in journals.	0	0.00%	0.00%		
	Other	1	25.00%		25.00%	
	Total Respondents	4				

9	How would you rate Biofeedback and/or Neurofeedback as a successful treatment plan overall?	COUNT	PCT.	0%	50%	100%
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	0	0.00%	0.00%		
	4	0	0.00%	0.00%		
	5 Neutral	2	50.00%		50.00%	
	6	0	0.00%	0.00%		
	7	0	0.00%	0.00%		
	8	0	0.00%	0.00%		
	9	0	0.00%	0.00%		
	10 Very satisfied	1	25.00%		25.00%	
	Total	4				
	Average					

10	If you have personally been treated with Biofeedback or Neurofeedback, please rate how successful the outcome was for you. If you have never had the treatment, skip to next question.	COUNT	PCT.	0% 50% 100%		
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	0	0.00%	0.00%		
	4	0	0.00%	0.00%		
	5 Neutral	1	25.00%	25.00%		
	6	0	0.00%	0.00%		
	7	0	0.00%	0.00%		
	8	0	0.00%	0.00%		
	9	0	0.00%	0.00%		
	10 Very satisfied	0	0.00%	0.00%		
	Total	4				
	Average					

APPENDIX H
RESPONDENTS WHO ARE
UNDECIDED/UNKNOWN IN REFERENCE
TO NEUROFEEDBACK

Neurofeedback and Biofeedback Therapy: Critical Opinion Comparison

Neurofeedback: Respondents Undecided/Unknown Table

1	What is your gender?	COUNT	PCT.	0%	50%	100%
	male	2	28.57%	28.57%		
	female	5	71.43%		71.43%	
	Total	7	100.00%			

2	What is your age?	COUNT	PCT.	0%	50%	100%
	21 - 30	1	14.29%	14.29%		
	31 - 40	3	42.86%		42.86%	
	41 - 50	0	0.00%	0.00%		
	51 - 60	3	42.86%		42.86%	
	61 - 70	0	0.00%	0.00%		
	71 - 80	0	0.00%	0.00%		
	80 +	0	0.00%	0.00%		
	Total	7	100.00%			

3	What is your current profession? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback specialist	0	0.00%	0.00%		
	Neurofeedback specialist	1	14.29%	14.29%		
	Psychiatrist	0	0.00%	0.00%		
	Psychologist	1	14.29%	14.29%		
	LCSW, MSW or MFT	0	0.00%	0.00%		
	Professor	6	85.71%			85.71%
	Academics/ Researcher	3	42.86%		42.86%	
	Other	4	57.14%		57.14%	
	Total Respondents	7				

4	What do you specialize in? (check all that apply)	COUNT	PCT.	0%	50%	100%
	Biofeedback	0	0.00%	0.00%		
	Neurofeedback	1	14.29%	14.29%		
	Psychiatry	0	0.00%	0.00%		
	Psychology	0	0.00%	0.00%		
	Psychotherapy	0	0.00%	0.00%		
	Research	1	14.29%	14.29%		
	Academics	3	42.86%		42.86%	
	Other	5	71.43%			71.43%
	Total Respondents	7				

5	How many years of biofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	7	100.00%			
	6 - 10	0	0.00%	0.00%		
	11 - 20	0	0.00%	0.00%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	7	100.00%			

6	How many years of neurofeedback knowledge do you have?	COUNT	PCT.	0%	50%	100%
	0 - 5	7	100.00%			
	6 - 10	0	0.00%	0.00%		
	11 - 20	0	0.00%	0.00%		
	21 - 25	0	0.00%	0.00%		
	26 +	0	0.00%	0.00%		
	Total	7	100.00%			

7	Please check off the conditions that you believe that Biofeedback and/or Neurofeedback therapy is successful in treating? Check all that apply.	COUNT	PCT.	0%	50%	100%
	Anxiety disorders	5	71.43%			
	Attention deficit disorders	0	0.00%	0.00%		
	Seizure disorders	1	14.29%			
	Autism	0	0.00%	0.00%		
	Addictions	2	28.57%			
	Trauma	2	28.57%			
	Anger management	3	42.86%			
	Other	2	28.57%			
	All of the above	1	14.29%			
	Total Respondents	7				

8	What factors influenced your opinion on whether or not Biofeedback and/or Neurofeedback is a reputable form of treatment? Check all that apply.	COUNT	PCT.	0%	50%	100%
	I feel the treatment is reputable	2	28.57%			
	Etiology learned within my specific field of study.	1	14.29%			
	Insurance company reimbursement	1	14.29%			
	Doesn't fit into the medical model or other known models of treatment.	0	0.00%	0.00%		
	Don't feel comfortable with procedure: not enough research done.	3	42.86%			
	I feel the research to date has been skewed through poor designs.	2	28.57%			
	My opinion has been based on literature read in journals.	2	28.57%			
	Other	2	28.57%			
	Total Respondents	7				

9	How would you rate Biofeedback and/or Neurofeedback as a successful treatment plan overall?	COUNT	PCT.	0%	50%	100%
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	1	14.29%			
	4	0	0.00%	0.00%		
	5 Neutral	3	42.86%			
	6	0	0.00%	0.00%		
	7	2	28.57%			
	8	0	0.00%	0.00%		
	9	0	0.00%	0.00%		
	10 Very satisfied	1	14.29%			
	Total.	7				
	Average					

10	If you have personally been treated with Biofeedback or Neurofeedback, please rate how successful the outcome was for you. If you have never had the treatment, skip to next question.	COUNT	PCT.	0% 50% 100%		
	1 Very dissatisfied	0	0.00%	0.00%		
	2	0	0.00%	0.00%		
	3	0	0.00%	0.00%		
	4	0	0.00%	0.00%		
	5 Neutral	0	0.00%	0.00%		
	6	0	0.00%	0.00%		
	7	1	14.29%	14.29%		
	8	0	0.00%	0.00%		
	9	0	0.00%	0.00%		
	10 Very satisfied	1	14.29%	14.29%		
	Total	7				
	Average					

APPENDIX I
EXPLANATION OF NEUROFEEDBACK
PROCEDURE WITH TRAUMA PATIENTS

EXPLANATION OF NEUROFEEDBACK PROCEDURE WITH TRAUMA PATIENTS

Neurofeedback alters the electrical frequency of the neurons in the brain. Due to trauma, instability of brain waves have occurred. To regain homeostasis, the neurons are re-taught how to fire the way they were originally intended. Normally, electrical frequencies pass through the brain cells at four different speeds while transmitting information.

When one is in the sleep state, the brain passes electrical charges in the delta range. This means that electrical impulses move through the neurons at about 4 cycles per second or 4 hertz (Hz). Another rate in which neurons pass through the cells is when the individual is in a deep relaxed state. This state is called theta. During theta, the impulses move around 4 to 8 Hz per second (Robbins, 1998; Lubar, 1998).

Alpha is another state that occurs when an individual is in a slightly relaxed state. In alpha state, signals move between 8 and 13 Hz. Finally, when the individual is in the most rapid state, he or she is experiencing beta waves. This occurs when the individual is in a normal awake state and the electrical charges are moving between neurons at a rate between 12 to 15 Hz with the low end being awake but relaxed, while the mid-range is between 15 to 19 Hz. Beta waves can pass between the neurons in a hyper-state during periods of excitement as high as 35 Hz per second (Robbins, 1998).

Normal operating speed of the brain during the awake state is about 14 Hz. However, individuals who are traumatized, show brain wave patterns that are often abnormal. It is believed that the trauma survivor struggles with brain waves that are running at varying degrees within the beta hyper-state. This has been considered to be the reason why individuals suffering from post-traumatic stress often experience startle response and anxiety. On the other end of the spectrum, an individual's brain that is running at a slower rate, say 8 to 13 Hz, most likely is suffering from fatigue, depression, attention deficit disorder, or mild dissociative disorders (Robbins, 1998; Lubar, 1998).

Research has found that often with brain trauma patients, too much theta, which is also found in depressed individuals, is present. In addition, when a neurofeedback technician has mapped the brain waves, it has been discovered that these patients do not have enough beta Hz. Through the use of neurofeedback, the patient can learn to re-train their brain. The patient learns how it feels and how to maintain the desired state (Robbins, 1998).

Adults who have been living with malfunctioning brain wave activity are taught through the use of operant conditioning provided through neurofeedback treatment. Trauma survivors often have not experienced the feeling of normalcy for many years. In other words, the adult who has lived in a hyper-arousal state since childhood, does not know how to relax in mind, body or spirit.

Neurofeedback is not risky to the patient in any way. Studies have been finding that the re-wiring of the brain through this technique tends to be permanent in most cases. If the brain's wiring (neurons) were caused to miss-fire due to childhood

trauma, then one could very well say that neurofeedback could then re-wire the brain to fire correctly. Once this has been accomplished, the brain works the way it should.

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