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A Descriptive Study of the Use of Neurofeedback in Counseling

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A dissertation submitted in partial fulfillment
of the requirement for the degree of
Doctorate of Philosophy in Counselor Education

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Abstract

This study examines neuro-counseling in the mental health field and the concept of neurofeedback training (NFB) as an intervention in the counseling profession. Numbers of studies have indicated that NFB may be effective in the field of counseling. The purpose of this survey study is to explore the use of neurofeedback in the field of counseling.

Additionally, the study used a quantitative descriptive survey research method and descriptive statistics. The survey was sent to members of the American Counseling Association (ACA), and 93 professionals participated. The majority of the sample was licensed professional counselors, professionals with a degree in counseling, and graduates of clinical mental health programs. Overall, the sample had a variety of respondents, some with experience in NFB and some not. For counselors interested in this topic, this study provides a rich literature review and a unique compilation of opinions of professionals providing NFB with counseling.

Findings indicate that including NFB in education counseling courses was highly recommended by many participants. Additionally, recommendations include suggestions for future research. Specific advice is that counselors should learn and be aware of the code of ethics when using NFB. Overall, this study finds that according to those respondents who practice NFB, when used with counseling, they believe that it is an effective treatment to lower symptoms and reduce medication dependence for several diagnoses, especially ADHD, depression, and anxiety.

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Sincere thanks to Professor Dr. Kristin Higgins, my dissertation adviser, and Dr. Michael Loos, Dr. Roy Fraley, and Dr. Michael Miller for their invaluable feedback and encouragement.

Dedication

This work is dedicated to neuro-counselors and to all future professional counselors.

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Chapter One: Introduction

A Researcher's Perspective on Neurofeedback

My interest in Neurofeedback training (NFB) and its potential use to counselors originated while completing a Master's degree in Counselor Education. I am now working on my PhD in Counselor Education and Supervision. My experience as a student involved working with multiple populations of clients, multiple diagnoses, and working in different types of clinics including private and public clinics, hospitals, and most recently in public elementary and middle schools.

During a 2012 conference at the American Counseling Association (ACA) in San Francisco I read an informational pamphlet about biofeedback and NFB training and its direct interactions with the brain. Since that first exposure to these ideas I have spent time researching biofeedback and NFB in an attempt to understand how they work and what benefits they could bring to my clients when used in a counseling setting.

Shortly after I left the ACA conference I contacted a local private clinic and got in touch with a licensed counselor who uses biofeedback and NFB in her clinic. As I observed the impact of using these methods in addition to traditional counseling skills on individuals and families, I became interested in learning more about the methods and the technology involved in their usage. As I began reading about current neuro-counseling research on the impact on the mind and body of clients, I also began investigating a wide range of training, books, articles, and websites.

Research in the fields of counseling, psychology, and neuroscience has confirmed that biofeedback and NFB combined with counseling actually change how the brain functions. On the basis of these findings, I thought it may be beneficial to write my dissertation about neuro-

counseling and its observed effects on clients' brains and how counselors can apply these interventions to their counseling practices. All these experiences, both personal and academic, have provided the impetus to explore a wide variety of opinions on neuro-counseling, the brain, and the effectiveness of using biofeedback and NFB in the counseling mental health profession.

Biofeedback is "a process that enables an individual to learn how to change physiological activity for the purposes of improving health and performance," sometimes using medical equipment to measure physiological activity (Myers & Young, 2012, p. 20). NFB is a subset of biofeedback that "allows clients to monitor and change their brain wave patterns, with the goal of changing behavior" (Myers &Young, 2012, p. 20). From what I learned in my courses and my observations during practicum and internship sessions, I conclude that the professionals in counseling overlook the value of neuroscience when applied to the field of counseling.

Currently, these clinics do not incorporate medical technologies such as EEGs or EKGs into their counseling practices. However, understanding the clients' brains is an integral part of the counseling process and neuroscience allows its users to reach a deeper understanding than previously available. "All of the main theories of counseling can be supported through the use of brain imaging that provides evidence of brain change in clients" (McHenry, Sikorski & McHenry, 2014, p.12). Since all workers categorized as "helping professionals" work with the brain on a daily basis, it is important to recognize how neuroscience can benefit each of them (McHenry et al., 2014).

I believe that integrating NFB and biofeedback into counseling might be the best way to incorporate neuroscience into the counseling profession. This belief is founded on feedback including "an understanding of neuroscience," and also "an applied means of intervention that counselors can implement to promote and evaluate positive client change" (Myers & Young,

2012, p. 20). This study aims to consolidate the thoughts and conclusions of practitioners who are already combining counseling with neuroscience, to explore which ages, populations, and diagnoses can most benefit from counselors trained in bio and NFB.

Summary of Relevant Literature

Based on the findings in the following publications, this paper will explore how NFB is integrated into the counseling field. Historically, research in this field started by examining biofeedback; researchers have only recently expanded their work to include NFB. Sarnoff (1982) explored how biofeedback could be useful for counseling professionals and in his 1982 article, "Biofeedback: New Uses in Counseling." Sarnoff (1982) suggested that more research be conducted in order to discover the possible uses of biofeedback in treatment, as well as developing ways to incorporate it in educational programs in order to expose counseling students to biofeedback literature and the possible uses and misuses of biofeedback in practice. Danskin and Walters (1973) strongly recommend counselors use biofeedback, believing that it has the ability to change clients' self-concepts, "enhancing their sense of worth, self-reliance and autonomy, to teach clients not to overreact to stress, to aid in desensitization, and to gain access to unconscious material" (Sarnoff, 1982 p. 358). Pulvino (1975) believed that biofeedback can benefit counselors' self-care as a method of training themselves to relax and exert better control over their energy, making them more able to effectively communicate with their clients (Sarnoff, 1982, p. 358). Sarnoff believed that by using biofeedback instruments to acquire more accurate images of the clients' responses to counseling, the counselor can develop a stronger empathic rapport with the client. In addition to this, the client may discover better ways to relax him or herself and experience a boost in creativity as a result of the newfound techniques.

NFB is biofeedback applied to the brain and central nervous system (Hammond, 2006). It has its foundations in neuroscience research as well as in data form clinical practice (International Society for Neurofeedback and Research Conference (ISNR), 2009). The majority of NFB studies have indicated that NFB is an efficacious treatment modality for a wide variety of symptoms including seizure disorders, traumatic brain injury, and attention deficit/hyperactivity disorder (ADD/ADHD) (Fox, Tharp & Fox, 2005; Hirshberg, Chiu & Frazier, 2005; Schoenberger et al., 2001; Sterman & Egner, 2006; Sterman & Friar, 1972; Thompson & Thompson, 2005). Studies have also indicated that NFT may be effective in treating the myriad of symptoms that may be associated with traumatic experiences, such as affective disorders (Hammond, 2005a, 2005b; Saxby & Peniston, 1995), substance abuse (Kelley, 1997; Peniston & Kulkosky, 1989, 1991; Scott et al., 2005; Trudeau, 2000), post-traumatic stress disorder (Peniston & Kulkosky, 1991; Smith, 2008), somatic symptoms such as migraine headaches (Kropp, Siniatchkin, & Gerber, 2002; Stokes & Lappin, 2010), chronic fatigue syndrome (James &Folen, 1996), fibromyalgia (Mueller et al., 2001), and the side effects of early childhood abuse and neglect (Huang-Storms, 2008).

Researcher Myers and Young (2012) specifically discuss the benefits of integrating NFT in counseling from the perspective of counselors (Myers & Young, 2012). Crane (2007) estimated that "there are between 10,000 and 20,000 NFB practitioners in the United States and half that number in other countries, although it is currently unclear how many of those are trained counselors"(Myers & Young, 2012, p. 25). While counselors are not using NFB as a mainstream practice, Myers and Young claim that demand is growing "for evidence of the effectiveness of counseling services [and that] the need to clearly link counseling interventions

and client change has never been greater," and that NFB may be the key to solving these problems (Myers & Young, 2012, p. 26).

Rationale of the Study

There are many compelling reasons to expand the knowledge base concerning the impact and efficacy of using NFB as a treatment. One of the most challenging issues that the field of counseling professionals deals with is how to make an effective diagnosis for each client's situation. Fisher (2014) argues that "most people, however, who find their way to NFB do so because they have tried almost everything else available and have along the way picked up multiple diagnoses" (p. 107). For example, many patients with a diagnosis of ADHD or ADD have similar symptoms to several other mental health diagnoses, but are given a popular diagnosis based on only one set of symptoms (Fisher, 2014, p.107). Similarly, "anxiety and depression can be tricky to understand and assign accurately," which makes it difficult for clinicians to correctly diagnose clients (Fisher, 2014, p.181). Treatment is always more difficult if a diagnosis is inaccurate. If NFB was used on a patient presenting with unclear symptomology, a clear diagnosis might be possible. The more accurate the diagnosis, the more efficient treatment will be: as counselors, "we are not training in relation to the diagnosis but in relation to the *individual* with the diagnosis" (Fisher, 2014, p.108).

Secondly, people with mental disorder diagnoses receive assistance from psychiatric and medication care. From my experience working in a hospital with psychiatric populations I found that patients receive treatment in the form of medication for a few days, stabilize their health, and they are able to leave the hospital. According to my supervisor, patients returned to the unit regularly. This could be for two reasons: they become addicted to pills and return to the hospital for more prescriptions or they stop taking their medication and they return to the hospital when

their health deteriorates. A common reason patients stop taking medications when they leave the hospital is the cost of prescriptions: for example, according to Hammond (2011), the cost of medication for a child with ADHD averages $1,678 per year (p.29). “Some individuals express concern about the cost of NFB being greater than the expense involved in drug treatment,” however, NFB proves “very cost effective” in the long run (Hammond, 2011, p.29).

Patients returning to hospital care regularly for mental health treatment creates and feeds addictions to psychiatric medications. Also, it does not help the long term health of patients. Demos (2005) agreed that, “medication alters – not heals – the electrochemical activities of the brain,”(p.4). By allowing psychiatric hospital patients access to counseling with biofeedback and NFT, I believe many patients could be helped to solve long term health problems instead of merely treating immediate symptoms. Demos (2005) confirmed that “Neurofeedback technology gives the clinician tools to assess and modify parietal lobe functioning without the use of medication. It shows the client where the problem is and what can be done about it” (p. 7). Although “some patients may not be able to forgo medications, but in most cases they will reduce or eliminate their reliance on them over time” if NFB becomes a regular part of treatment (Fisher, 2014, p. 157).

In addition, Horvat (2007) reports that 47% of the membership in the International Society for Neurofeedback and Research, the leading professional organization for NFB practitioners, hold doctorates in psychology, while 26% hold master’s degrees in areas like social work, mental health, and educational counseling. This is the reason a study such as this dissertation is crucial for mental health professionals who might not have a medical background: the results of this study can help counseling professionals who are interested in NFB.

Research Question

This study will explore the central research question, "What is the importance and prevalence of the use of Neurofeedback in the field of counseling?"

Definitions of Terms

The following are terms and definitions used in this study. The terms are defined according to their use in this research study.

Biofeedback

A process that utilizes instruments to measure a person's physiological process, such as brainwaves, heartbeat, muscle activity, and skin temperature, so that the person can learn how to regulate these processes. The purpose of this learning process is to improve health and performance (International Society for Neurofeedback and Research Board of Directors, ISNR, April 2009).

Mental Health Professional

A person licensed to provide mental health services. Mental health professionals may include counselors, psychologists, social workers, psychiatrists, and nurses with a specialty in psychiatric nursing.

Neurons

Basic cells in the brain that receive, transmit, and integrate information.

Neurotherapy

A treatment which changes the way the brain works, and once the skill is learned, (unlike medication) it appears to be persistent. Neurotherapy is a metabolic tracking and changing tool that is orchestrated by the therapist and played out by the client. Neurotherapists have an in-

depth knowledge of neuronal communications and the operations of various regions of the brain. More importantly, they can apply their expertise to the clients' presenting problem.

Neuroscience

Neuroscience is the scientific study of the nervous system. Traditionally, neuroscience has been seen as a branch of biology. However, it is currently an interdisciplinary science that collaborates with other fields such as chemistry, computer science medicine, genetics, and allied disciplines including philosophy, physics, and psychology.

Neurofeedback (NFB)

A form of biofeedback that uses monitoring devices applied to the scalp, in order to provide information to individuals on the state of their physiological functioning. In contrast to biofeedback, NFB focuses on the central nervous system and the brain.

Qualitative (QEEG)

The QEEG is an extension of the analysis of the visual EEG interpretation which may assist and even augment our understanding of the EEG and brain function. Quantitative Electroencephalography (QEEG) is a procedure that processes the recorded EEG activity from a multi-electrode recording using a computer.

Overview of Methodology

The descriptive research survey study is designed to explore the central research question: What is the importance and prevalence of the use of Neurofeedback in the field of counseling. This study uses a survey to determine counselors' personal experiences of using NFB. The survey allows the researcher to collect data from participants to discover influencing factors in their NFB treatments. A random sample of professional counselors was obtained from the American Counseling Association Research Office.

Summary

In this chapter, I have stated my personal connection to the topic. The literature indicates that NFB is an effective intervention for numerous disorders and demographics. The purpose of this study is to explore the factors and processes that contribute to treatment outcomes when NFB is used with patients. The sample for my study will consist of mental health professionals who will provide data through my survey. Definitions of neuroscience, neurotherapy and NFB training were provided.

Chapter Two: Review of the Literature

This literature review, divided into four parts, will explain how several topics are connected, and how they provide the background for this particular study of the factors and processes that contribute to positive outcomes when NFB is used on an individual in a counseling setting.

First, this literature review includes a brief history of the neuro-counselor in counseling. The second section provides a brief history of neuroscience. The third section provides a background of NFB in the field of counseling as well as a list of research studies that indicate that NFB can be an efficacious treatment for a wide variety of symptoms. The fourth section explains the experiences of counselors who use NFB in practice.

Neuro-counselor and Counseling

Historical Perspective

The earliest studies involving biofeedback and NFB were completed by prominent figures in the counseling profession and support utilizing this technique in counseling treatments. Sarnoff (1982) explored how biofeedback could be useful for counseling professionals. He suggests that more research be conducted in order to discover the possible uses of biofeedback in treatment as well as developing ways to incorporate it in educational programs in order to expose counseling students to biofeedback literature and the possible uses and misuses of biofeedback in practice. Danskin and Walters (1973) strongly recommended counselors to use biofeedback, believing that it has the ability to change clients' self-concepts, "enhancing their sense of worth, self-reliance and autonomy, to teach clients not to overreact to stress, to aid in desensitization, and to gain access to unconscious material" (Sarnoff, 1982 p.358). Pulvino (1975) believed that biofeedback can benefit counselors' self-care as a method of training themselves to relax and exert better control over their energy. By doing this, counselors are able to communicate with

their clients more effectively (Sarnoff, 1982, p.358). Sarnoff (1982) believed that by using biofeedback instruments to acquire more accurate images of the clients' responses to counseling, the counselor can develop a stronger empathic rapport with the client. In addition to this, the client may discover better ways to relax him or herself and experience a boost in creativity as a result of the newfound techniques.

Concerning the ethics of biofeedback in counseling, Onoda (1978) stated that studies indicate that biofeedback can be effectively used to treat many psychological disorders, physiological disorders, or a combination of these types of disorders. Despite its growing popularity, Onoda (1978) claimed that there are ethical issues that counselors may face when using biofeedback as opposed to other methods of treatment. For example, as biofeedback can be used to treat both mental health and medical issues therapist face confusion regarding which issues they are qualified to treat. Another issue he covers is the competency of practitioners; while he believes that incorporating biofeedback into counseling would be beneficial, he recognizes that students of counseling are not very likely to have had courses in psychophysiology. He claimed that "because of the growing awareness of mind-body determinants of self-development and mental health, counselor-education programs need to expand their curricula to include courses that cover the psychophysiological field" (Onoda, 1978, p12). He recommended teaching biofeedback as an individual course in counseling education programs and how that would benefit counseling students looking to employ these methods in their practice.

A study by Chandler (2001) confirmed that "counselor education programs should consider the importance of teaching not only counseling theories and skills, but also techniques that enhance the personal wellness of the counselor" (p. 2). The purpose of the study was to

determine if biofeedback-assisted relaxation training could reduce stress levels in a group of randomly selected counselor trainees enrolled in a basic counseling skills course (Chandler, 2001). As a result, biofeedback-assessed relaxation therapy was shown to be a useful tool in enhancing both a physiological indication of relaxation and a self-reported sense of increased well-being of the counselor trainees. The counselor trainees may find these techniques learned in biofeedback therapy useful throughout their lives (Chandler, 2001).

Ratanasiripong et al., (2012) investigated the effectiveness and acceptance of biofeedback training as an adjunct to traditional counseling within a college counseling center. The participants of the study were 30 counseling clients, 20 women and 10 men, from one university counseling center. Their age range was between 18 and 42 years, and they were randomly assigned to either the treatment group or the placebo control group. Participants in the treatment group received four sessions of individual counseling plus four sessions of biofeedback training in four weeks. As result of the study, the group of participants who received biofeedback training in conjunction with counseling reported greater reduction in anxiety symptoms than the group who received counseling alone. Therefore, the findings of the study show that using biofeedback alongside counseling treatments is an effective way to treat stress and anxiety among college students. Ratanasiripong at al., (2012) added recommendations for college counseling centers to use biofeedback as a tool in their center to meet the mental health needs of college students.

Walsh (2010) mentioned how biofeedback intervention fits well into counseling by positively affecting a client's wellness perspective. As well as teaching clients biofeedback techniques, clients can learn self-awareness and self-regulation skills. Walsh (2010) indicated that this may empower them to improve their level of stress management and their coping strategies, and increase their level of wellness. She believed that these methods are effective

when used in counseling and encourages counselors to incorporate biofeedback interventions in their counseling practices.

Ivey, Ivey, Zalaquett, & Quirk (2009) explained that while they are not aware of curriculums that seriously discuss the uses of neuroscience and cognitive science in counseling and therapy practice, the Council for Accreditation of Counseling and Related Educational Programs' (CACREP) 2009 standards support the need for this incorporation in one of its "eight common core curricular areas." The area of Human Growth and Development is described by the CACREP Standards as "studies that provide an understanding of the nature and needs of person at all developmental levels and in multicultural contexts … including … a. theories of individual and family development and transitions across the life span [and] b. theories of learning and personality development, including current understandings about neurobiological behavior" (Ivey et al, 2009).

As the above research indicates, prominent figures in the counseling profession have recommended incorporating biofeedback and NFB into counseling practices since as far back as 1982. Studies show that this has the potential to improve the wellness of clients and of counselors themselves. Next, this literature review will provide a brief overview of some of the basic neuroscience required for counselors to understand and incorporate NFB.

Neuroscience

Definition of Neuroscience

In their book "A Counselor's Introduction to Neuroscience," McHenry, Sikorski, & McHenry (2014) generally discussed useful information about the benefit of neuroscience to counselors, and how neuroscience can help counselors work better with their clients. They state that the fields of neuroscience and neuro-counseling are definitely in their infancy, therefore

information, comments, and studies may change in the future. They maintain that there are five major forces useful to understanding clients and the counseling process: they are psychoanalysis, behaviorism, humanism, multiculturalism, and finally neurocounseling. Additionally, they define neuroscience as, "anchored in considered, measured, and verified science that demonstrates the activity and chemistry of brain as they function throughout the lifespan" (p.15). The authors agree that most counseling theories support that clinicians should be aware of the connections between neuroscience and neurocounseling. Counselors should become aware of their biases, values, beliefs about human nature, and finally their particular theory of how people change. One way of measuring brain change is neuroscience. The authors argue that as we start to understand the impact of counseling on the brain through a neuro-lens we see that most counseling theories do present the possibility of having a positive impact on the brain of the client. "Supporting evidence of changes in the brain has now been documented using data from neurological scans conducted during the counseling process" (p. 11). According to the authors, brain imaging provides evidence of brain change in clients, supporting all of the main theories of counseling.

Chapin and Rusell-Chapin (2014) also supported the use of neurosciences in practice and how it helps counselors to better understand their clients. They argue that counselors must understand the ways in which the brain functions. They also provide that neuroscientists understand that the brain has the capability to develop living neurons up until the very end of the clients' lives, a process called neuroplasticity, which is an important new understanding in neuroscience. Because of neuroplasticity, the brain's neurons can be altered through NFB, in a process called neuromodulation. These advances in neuroscience allow clinicians to understand more fully about why clients change and how symptom reduction occurs.

Another study by Cozolino (2002) defined neuroscience as a field that helps understand how neurons create the processes of the mind. The author states that "neuroscience focuses on quantifiable, objective data and the scientific method to create models of mind and brain" (p. X). This allows a new, additional perspective on both diagnosing and treating psychiatric disorders. Cozolino concludes that "the neuroscience of psychology offers a unique perspective for clinicians, focusing on the growth of the mind by integrating neuroscience and psychotherapy research findings with the wisdom of an extremely useful and compassionate clinician" (p. 3).

All the above sources recommend counselors to be aware of the connections between neuroscience and counseling. In fact, Meyers and Young (2012) believed neuroscience is the future of counseling. All counseling theories support or encourage the idea of using neuroscience in counseling. The main point of a counselor is to help the clients to positively change their behaviors, feelings, and attitudes. In order to do this, counselors deal with the brain; neuromodulation and neuroplasticity are part of the counseling process, and neuroscience allows counselors to observe and quantify these processes.

History of Neurosciences in Counseling

Montes (2013) recounted the success of Lori Russell-Chapin's experiences with incorporating neuro-science into counseling. Her neural feedback treatment program, which she has used on hundreds of clients over four years, "combines real-time brain-wave analysis with cognitive therapy" (Montes, 2013). She claimed that people's comfort with who they are as a person is much higher when their central nervous systems are functioning better. People have the ability to regulate their brains, and if a counselor can see their client's brain waves changing, then the methods they use become much more effective.

McHenry (2014), astonished by his positive experiences with NFB, wrote that ten years ago he could not have seen himself working so closely to the field of neuroscience as a counselor. He says "that's not what we do in counseling. What we do in counseling is more artistic than regimented" (Montes, 2013). However, he now believes that the more a counselor knows about his or her clients' brains, the better.

However, some scientists who examine a historical perspective of neuroscience in counseling do not have such faith in the process. They see the claims surrounding neurocounseling as a "panacea for emotional and psychological suffering" (Hennelly, 2014). Hennelly believed it is likely that "the therapeutic relationship … will continue to occupy center stage" and that the center of the therapeutic relationship will not be the brain, but the hearts of the counselor and client (ibid).

Ivey & Ivey (2014) have been researching neuroscience and how it applies to the counseling professions since the 1970s. They were keynote speakers at the American Counseling Association's 2013 Conference & Expo in Cincinnati, were they gave their speech titled "What Counselors Need to Know About the Intersection of Neuroscience and Counseling." In this presentation, the Ivey's emphasized the benefits of neuroscience in counseling regarding empathy between the counselor and the client. Mary Ivey pointed out that "empathy has long been basic and central to our profession and to our personal identity as counselors … Now, empathy can be identified through observation of brain activation through functional magnetic imaging" (p.44).

Ivey, Ivey, Zalaquett, & Quirk (2009) argued the relevancy of neuroscience and cognitive science in counseling practice. Their first point is that applying neuroscience to counseling allows counselors to see why and how well their methods are working. Neuroscience and

neuroimaging have shown that “measurable structural changes occur in client brains as a result of cognitive and interpersonal therapy” (p.44). Through these observations, counselors can modify their treatment methods to better suit the client. They list five basic concepts that illustrate the usefulness of neuroscience to counseling: neuroplasticity, neurogenesis, the importance of attention and focus, clarifying our understanding of emotions, and focusing on wellness and the positive.

The Brain and Neuroanatomy

Next, it is important to quickly overview some general observations about the human brain, and how the structure of the human brain relates to neuroscience. Evans and Abarbanel (1999) considered that “practitioners of EEG neurofeedback need to be familiar with brain anatomy and physiology” (p. 219). To practice NFT in counseling counselors should administer EEGs and understand the brain structure. Changes in brain pattern occur and are associated with positive changes in physical, emotional, and cognitive states. Fisher (2014) noted that all mental disorders come from perturbations in the brain’s rhythms.

As Wood et al. (2007) explained, neurologists divide the structure of the human brain into the brain stem and midbrain, the limbic system, and the cerebral cortex. The brain stem and midbrain are also commonly called the reptilian brain; the reptilian brain regulates basic biological systems (Perry, 2002a). The limbic system regulates the nervous system, including traumatic stress reactions (Perry, 2002a; Rothschild, 2000).The hippocampus and the amygdala are two lobes within the limbic system that are crucial to memory storage and information processing (Rothschild, 2000). In order to properly process life events, especially stressful ones, mature functioning of the amygdala and the hippocampus is necessary (Rothschild, 2000). Finally, the cerebral cortex regulates higher brain functions such as abstract thought, concrete

thought, problem solving, speech, and semantic and procedural memory (Perry, 2002a; Rothschild, 2000).

In sum, this section demonstrated that academics have advocated for mental health professionals to include neuroscience in their practice for many years. This study also provided a brief overview of what mental health professionals might need to know about the brain and neuroanatomy in order to consider incorporating NFB into their practice. This concludes the study's general overview of neuroscience; a more specific section regarding NFB and NFB training follows.

Overview of Neurofeedback in Clinical Settings

Definitions of Neurofeedback

Different authors have resolved the difficult issue of how to define NFB in multiple ways. Demos (2005) defined NFB as,"a comprehensive training system that promotes growth and change at the cellular level of the brain. It takes science out of the laboratory and into the hands of private health professionals. Neurofeedback technology gives the clinician tools to assess and modify parietal lobe functioning without the use of medication. It shows the client where the problem is and what can be done about it" (p. 3). In addition, Masterpasqua & Healey (2003) provided a definition of "EEG biofeedback or EEG operant conditioning." This is "an emerging modality with the potential of becoming an important part of effective psychological practice," and "a process whereby individuals learn to self-regulate their brain waves." (p. 652).

The most thorough definition of NFB is from the International Society for Neurofeedback and Research (ISNR) (2009), which provided this definition for consistency in the literature and research on NFB:

> Like other forms of biofeedback, neurofeedback training (NFT) uses monitoring devices to provide moment-to-moment information to an individual on the state of

> their physiological functioning. The characteristic that distinguishes NFT from other biofeedback is a focus on the central nervous system and the brain. NFT has its foundations in basic and applied neurofeedback as well as data-based clinical practice. It takes into account behavioral, cognitive, and subjective aspects as well as brain activity. NFT is preceded by an objective assessment of brain activity and psychological status. During training, sensors are placed on the scalp and then connected to sensitive electronics and computer software that detect, amplify, and record specific brain activity. Resulting information is fed back to the trainee virtually instantaneously with the conceptual understanding that changes in the feedback signal indicate whether or not the trainee's brain activity is within the designated range. Based on this feedback, various principles of learning, and practitioner guidance, changes in the brain patterns occur and are associated with positive changes in physical, emotional, and cognitive states. Often the trainee is not consciously aware of the mechanism by which such changes are accomplished although people routinely acquire a 'felt sense' of these positive changes and often are able to access these states outside the feedback session. (pp, 1-2).

History of Neurofeedback

Neurofeedback, or biofeedback applied to the brain (Hammond, 2007), has its foundations in neuroscience research as well as in data from clinical practice (ISNR, 2009). In contrast to biofeedback, which focuses on physiological functioning, NFB focuses on central nervous system and the brain (ISNR, 2009). The basis for NFB training is the brain's electrical nature, which allows brain cells, or neurons, to communicate; and its ability to self-regulate (ISNR, 2009). At the level of the neurons, the goal of NFB is to increase the brain's stability and flexibility, meaning its ability to maintain arousal or relaxation states, as well as move back and forth between states, and the skills of self-regulation (Othmer & Othmer, 1999).

NFB began in 1875 when British physician Richard Caton observed electrical activity in the exposed cortices of animals (Masterpasqua & Healey, 2003, p. 652). According to the author, the first human EEG and was the first researcher to analyze the raw EEG through a statistical procedure called fourier transform, the origin of quantifying EGG through mathematical analyses. "Berger's work encouraged others to determine whether particular

features of an EEG were diagnostic for neurological or physiological disorders" (Masterpasqua & Healey, 2003, p.653).

Researchers studying EEG activity in animals and humans in the 1960s and 1970s "discovered that it was possible to recondition, retrain or learn different brainwave patterns" (Hammond, 2007, p. 26). The discovery of brain wave training marks the historical beginning of NFT, or EEG biofeedback. (Id.). It was particularly a 1972 study concerning seizure disorders by Sterman and Friar that led directly "to the first use of EEG biofeedback for ADHD" (Masterpasqua & Healey, 2003, p.653). Huge advances in neuroimaging in the past 20 years have caused a revolution in neuroscience. Since 1999, the work of many scientists have documented that "a number of psychological disorders, including ADHD, mood disorders, and schizophrenia, may be discriminated by characteristic patterns" of quantifying EEG (Masterpasqua & Healey, 2003, p.655).

Theoretical Background for Neurofeedback

NFB is essentially EEG biofeedback, and allows individuals to learn to modify brainwave activity to alter and improve states of cognitive process such as alertness, attention, calmness, internal focus of flexibility (Demos, 2005; Thompson & Thompson, 2003). The theoretical basis for NFB comes from the law of effect and learning theories, which propose that rewarding a specific behavior will increase the likelihood of that behavior occurring again (Thompson & Thompson, 2003). With the law of effect, learning theories such as operant conditioning have found that successive approximations toward desired behavior through positive reinforcement will increase the likelihood of the behavior reoccurring (Skinner, 1935, 1937, 1950). Conditioning is the influence of changing the direction of behavior through a reinforcing stimulus that is temporally related with the order of stimulus and reward strengthened

through correlation or contingency (Skinner, 1950). The operant conditioning paradigm set the implications that contingent reinforcement is the most basic form of behavior, even before classical conditioning (Skinner, 1935). Initially, the process of NFB presents much like the incidental learning of pigeons trained with superstitious behaviors (Skinner, 1950), and conditioning may be completed through complex operant behaviors that result in reinforcement through successive approximation (Skinner, 1937).

NFB may involve other learning approaches, such as classical conditioning that influences the improvement of brain function. Thompson and Thompson (2003) suggested that through NFB the desired brain state becomes a conditioned response over time in completing homework assignments. However, neruofeedback is based primarily on operant conditioning through auditory and /or visual rewards that result when EEG frequencies reach specific amplitude thresholds (Demos, 2005; Thompson & Thompson, 2003). The temporal relationship between EEG patterns and auditory/visual rewards successively approximate the brain behavior toward increased performance. The individual who participates in training becomes increasingly self-aware of what brain behaviors are expected and is also able to generalize this learning to real-life situations such as in school or work (Demos, 2005; Thompson & Thompson, 2003). NFB may be summarized as an intervention or training technique that helps individuals to learn to modify neural activity in order to balance arousal levels and self-awareness of various cognitive states (Demos, 2005; Thompson & Thompson, 2003). There are disorders like ADHD that have specific EEG phenotypes identified as having theta/beta ratios greater than 3:1 in frontocentral regions associated with inattention and poor concentration, which suggests the need to inhibit slow wave frequencies while increasing sensorimotor and Beta 1 (Demos, 2005; Thompson & Thompson, 2003).

Neurofeedback Training

NFB training is EEG biofeedback with the additional component of clinician-assisted therapy. A study by Hammond (2011) discussed NFB methodology, and states that electrodes are placed on the scalp and earlobes so that electronic equipment can provide real time, instantaneous audio and visual feedback about the client's brainwave activity for the client to observe. In addition, according to Hammond, the client will observe their brain waves for about 20 to 25 minutes each session, and initial improvements are often noticed in the first five to 10 sessions. Different diagnoses require different numbers of sessions. For example, Hammond recommended 15-20 sessions for anxiety or insomnia, and 40-50 sessions for ADD, ADHD, or learning disabilities. However, Hammond noteed that there are different forms of NFB that vary from traditional NFB, and each clinician can make choices about the variant of training they wish to use based on the specific needs of each of their clients. The efficacy of NFB depends on the choices of the clinician. Basically, as the author summarizes, NFB is like exercising, or doing physical therapy with the brain.

"The individual who participates in training becomes increasingly self-aware of what brain behaviors are expected and is also able to generalize this learning to real –life situations such as in school or work" (Demos, 2005; Thompson & Thompson, 2003). Therefore, self-awareness – an important concept in the counseling profession – can be taught to clients through the training technique of NFB. This is crucial for clients to successfully implement what they learn in counseling in their daily lives.

Finally, Hammond noted that individualized assessment and personalized treatment by a certified professional therapist is crucial to NFB being successful. All sessions should be supervised by a counselor who is knowledgeable, qualified, and certified in NFB techniques; any

unsupervised practice of this therapy could harm clients, cause side-effects, and lead to ineffective results.

Defining Emerging Brain- Changing Technologies

Table 1
Special Types of Neurofeedback

LENS The Low Energy Neurofeedbcak system	Is a unique passive form of neurofeedback that produces its effects through feedback that involves a very tiny electromagnetic field. LENS has been used to modify behavioral problems in animals. It also commonly seems to produce results faster than traditional nerofeedback, and it can be used with very young children and with individuals who are less motivated and who do not have the impulse control or stamina required with other neurofeedback approaches.
Hemoecephagraphy (HEG)	Are the positive or negative polarizations of the EEG in the very slow frequency range from .3 Hz to usually about 1.5 Hz.
Heart-rate Variability (HRV)	Uses breathing (about 5-6 breaths per minute) and concentration on a positive emotion to change the brain.
The Neuro Field	Developed by Nicholas Dogris, uses pulsed electromagnetic field to stimulate and balance the entire nervous system.
Slow Cortical Potentials (SCP)	Developed and used in Europe by Nils Birbaumer, it uses more DC than AC frequencies. Infra-low frequency training (ILF) is AC training so slow that is seems like DC training. Both SCP and ILF can be trained with operant conditioning techniques.
Z-score training	Is a more recent innovation that usually utilizes two, four, or more electrodes on the head.
LORETA	Refers to low resolution electromagnetic tomography.
Functional Magnetic Resonance Imaging (FMRI)	Is a very sophisticated type of neuroimaging that examines brain activation to evaluate brain functioning.

Chart provided by Larsen (2012).

This section addresses the history and theoretical background of NFB in general, defines NFB, provides an overview of NFB and of specialized types of NFB. It also examines the history of NFB in counseling. This all raises huge questions: What is NFB? Where did it come from? What are brain waves? How can one tool treat so many disparate problems? How can something that works so well, and seems to perform miracles, not be in widespread use?

In terms of how NFB can be used in counseling**,** it is "a method that counselors can use in both academic settings and practice settings" In this view, NFB is "among the most accessible and tangible applications of neuroscience that counselors might utilize for the neuroscience needs of the counseling field". In sum, "neurofeedback is consistent with counseling's wellness perspective, making biofeedback and neurofeedback well suited for counselor in training to receive training in and to use in practice"(Hammond, 2011, p. 26).

Review of Current Studies on Clinical Experience

The following discussion will list some clinical conditions for which the efficacy of NFB has been reported. Published controlled studies, outcome studies and case studies will be specifically noted. This review also includes reports of clinical experiences, with the understanding that these reports may not yet have been subject to peer review.

Areas of Application for Neurofeedback Treatment

Hammond (2011) has found that NFB can successfully treat ADD/ADHD, learning and developmental disabilities, cognitive and memory enhancement, uncontrolled epilepsy, alcoholism and substance abuse, posttraumatic stress disorder, and Autism and Asperger's syndrome (Hammond, 2011). Chapin (2014) emphasized that "neurofeedback has been found to be helpful with ADHD, seizure disorders, anxiety, depression, trauma, addiction, insomnia, immune functioning, and autism spectrum disorders. It has also been used for perk performance in sports, business, and the creative arts" (p. 83).

Attention deficit/hyperactivity disorder. Of all the disorders that clinicians have attempted to treat with NFB, ADD/ADHD has the largest body of scientific work proving success. A study by Montes (2013) indicated that neurofeedback may be more effective than Ritalin in decreasing symptoms of ADHD, with the added benefit that the NFB participants did

not have to remain on medication for continued benefit from the treatment. One study by Kropp et al., (2002) found that 20 hours of NFB training, in the form of 40 sessions of 30 minutes each, relieved ADHD symptoms as effectively as Ritalin. Another study indicated that the same results could be achieved with 10 hours of NFB, or 20 sessions of 30 minutes each (Rossiter & La Vaque, 1995).

Depression. A sizeable amount of research indicates the benefit of NFT in resolving depression symptoms. A study by Hammond (2005a; 2005b) on NFB training for depression found that 77.8% of nine participants classified as severely depressed made significant improvements, as measured by pre and post-testing. Many of the participants who were taking prescription medication at the start of the study no longer needed it at the end of the NFB training. A more recent study by (Hammond, 2007) included 10 participants diagnosed with PTSD who also demonstrated symptoms of depression, diminished capacity for attention, and substance abuse. Participants were given 10 sessions of NFB awake state training followed by 20 sessions of alpha-theta training. Research outcomes, gauged by pre and post-testing using the Hamilton Depression Rating Scale and the Test of Variables of attention (TOVA), found a significant decrease in depression symptoms as well as significant increase in ability to sustain attention.

Anxiety. A literature review by Hommand (2011) included 14 studies of the effects of NFB on the anxiety disorder spectrum, including eight studies of NFB on generalized anxiety disorder (GAD), three on phobic anxiety disorder, two studies on obsessive compulsive disorder, and one report on post-traumatic stress disorder (PTSD). The results were overwhelming: seven of the eight GAD studies documented positive clinical changes in anxiety symptoms.

Substance Abuse. In 1989, while working at a Veterans' Administration Hospital in Colorado, Peniston published one of the first research studies documenting the effectiveness of NFB on substance abuse issues (Peniston & Kulkosky, 1989). The specific protocol used in the study, later named the Peniston protocol, combined biofeedback hand warming with 10 sessions of awake state NFB training and 20 session of deep state alpha-theta training. In this particular study the experimental group consisted of 30 men, 20 of whom were identified as severe alcoholics with a record of at least four previous admissions for alcoholism treatment, and an average of 20 years of alcohol dependence results (Peniston & Kulkosky, 1989).

Additional studies on the effect of NFB combined with deep state alpha-theta training for substance abuse issues also indicate positive results. Peniston utilized the alpha-theta protocol in a study on 14 men and women with an average of 17 years' alcohol dependence, plus symptoms of depression, with the results that 21 months later, 13 of the 14 were still in remission (Saxby & Peniston, 1995).

As the above research indicates, numerous clinicians have found that NFT can be effective in treating ADD/ADHD, depression, anxiety spectrum disorders, and substance abuse. Moreover, many of these studies indicate that NFB is a more effective long-term solution than medication. "Neurofeedback seems to be effective, not as a stand-alone procedure but rather when combined with cognitive strategies and other forms of biofeedback for both psychopathology and physical and developmental and performance enhancement." In conclusion, when NFB is used by a qualified, empathetic counselor who has a strong relationship with their client, it can lead to extremely positive results in many clinical settings.

Summary

This chapter includes a brief history of the neuro-counselor in counseling, a history of neuroscience, an overview of research indicating that NFB can treat a wide range of symptoms, and the experiences of counselors using NFB for specific disorders. The overview of clinicians and researchers concludes that attention deficit/hyperactivity disorder, depression, anxiety, and substance abuse disorders are only some areas where NFB treatment can be effective.

Chapter Three: Methodology

This chapter describes the quantitative methodology and research questions used for data collection and analysis of the study. The chapter includes an explanation of why a quantitative descriptive survey research method is appropriate for this study. It also states the research questions, the research design of the study, and an overview of ethical concerns. Additionally, it includes information about the sample, instrumentation, and method of the data collection. Finally, it includes an analysis of the validity and reliability of the study, and data analysis.

An Overview of the Quantitative Descriptive Method

The study used a quantitative descriptive survey research method. Descriptive research includes a method to describe a given population and does not attempt to establish a causal relationship (Sing, 2007). Quantitative research has two strategies of inquiry: survey and experiments (Creswell, 2009). A survey design provides descriptions of trends, attitudes, and opinions about a population (Creswell, 2003). In this study, the population at issue is members of the American Counseling Association (ACA), and the purpose of the study is to determine their trends, attitudes, and opinions regarding the use of biofeedback and NFB in counseling.

The methodology of descriptive studies attempts to discover who, what, when, where, or how (Cooper & Schindler, 2003). It has helped this researcher to determine who uses NFB, their education and background, and their reasons for using these techniques. For professional counselors to learn from fellow counselors in the sample about how they started using these techniques and what training they required and recommend is useful. It also provides an opportunity for the sample to provide advice to others in the field of counseling.

According to Leedy and Ormrod (2010), descriptive studies attempt to acquire information about groups of people by asking questions and tabulating the answers to make

inferences about a large population. Descriptive research studies do not normally test a hypothesis, but seek to provide a description of a population and answer research questions (Bickman & Rog, 1998; Gliner & Morgan, 2000; Sim & Wright, 2000). Survey research involves acquiring information about one or more groups of people-perhaps about their characteristics, opinions, attitudes, or previous experiences-by asking them questions and tabulating their answers (Leedy & Ormrod, 2010). Therefore, the survey format will help this study reach large populations to learn their opinion and develop more reliable results, which in turn might help future researchers interested in the questions posed here. This allowed the researcher to analyze the opinions of a large sample of experienced professionals.

According to Creswell (2010) quantitative research is a type of educational research in which the researcher decides what to study; asks specific, narrow questions; collects numeric data from participants; analyzes these numbers using statistics; and conducts the inquiry in an unbiased, objective manner (p. 39). The quantitative descriptive method was judged appropriate for this study because it allows the researcher to use data from a survey (Neuman, 2003). The selection of a quantitative descriptive method allowed the researcher to use survey questionnaires and data collection to measure, compare, and contrast the results (Cooper & Schindler, 2003; Neuman, 2003). Specifically for this dissertation, the quantitative survey will provide a description of counselors' professional opinions about using biofeedback and NFB in the field. This researcher can draw conclusions about the demographics of counselors and their patients, and can also quantify the effectiveness of NFB in a counseling setting. Using survey questionnaires and data collection to measure, compare, and contrast results helps the researcher to identify key factors and processes in the use of NFB.

In conclusion, surveys allow the study to capture the attitude and opinions of professional counselors toward biofeedback and NFB. Additionally, statistical descriptive research allows the target audience to learn from the opinions of more experienced professionals. Logistically, this approach allows the researcher to engage a very large sample population. This quantitative descriptive research design was appropriate to answer the study's main research problem: it allowed the researcher to compile attitudes, trends, and opinions into numeric data that measures the use of NFB in professional counseling.

Sample

The sample for this study is drawn from members of the American Counseling Association (ACA). The ACA is, "a not-for-profit, professional and educational organization that is dedicated to the growth and enhancement of the counseling profession." ACA member email addresses are listed in the membership directory which is available on the ACA website and can be accessed only by members of ACA. The ACA has over 55,000 members, all of whom are professional counselors. By e-mailing these members this study sought to access the largest possible sample set of American counselors. The roughly 55,000 counselors who received this survey were asked to proceed with the survey if they use NFB in their practice, however there is question whether all the respondents currently use NFB in their practice as only 22 answered this specific question in the positive. The wording of this question on the demographic inventory should have read if you have ever used NFB versus currently using NFB, so it is somewhat clear if the other 57 respondents do have professional experience with NFB. This is definitely a limitation and an assumption that I as the researcher have chosen to make regarding the other 57 respondents.

Chapters four and five of this study will analyze the demographics and replies of respondents in more detail, but a brief overview follows. Ninety-three members of the ACA replied to this survey. Of these 93 respondents, 14 of the respondents did not complete the entire survey so their results were eliminated. Once these 14 were omitted, the sample size was a total of 79 ACA members. Twenty-four of these 79 were male and 55 were female. Sixty-one, or 77.2%, of respondents identified as Caucasian, with 6 African American respondents, 4 Asian, 4 Hispanic, and 4 respondents identifying as other. Twenty-one members of the sample set are from the Eastern United States, 26 from the Southern United States, 16 are from the Midwest, and 14 are from the Western United States. Two of the respondents did not respond to this question.

Informed Consent

In the informed consent agreement (see Appendix B), all participants in the study were informed of the study purpose and the timeframe for the survey and data collection. Participants were also informed in writing that participation in this study was voluntary and that participants were allowed to withdraw from the study at any time. Finally, all participants were informed that responses and participation would be confidential.

Confidentiality

Because ACA members were asked personal information about themselves, their experiences, their opinions, and their professional practices, confidentiality was a priority for the participants of the current study. All study results will be reported anonymously. Although results from this research may be published, no names or personally identifying information will be used, and all results will be kept confidential by the researcher. Voluntary responses to the survey will be collected in an e-mail account maintained by the University of Arkansas, and only

the researcher has access to this account. If a participant wished to withdraw from the study, their survey response and any other information, including their e-mail address, was immediately deleted. The researcher was available via e-mail to address any confidentiality concerns that participants experienced throughout the timeline of the study.

Research Question

This study will explore the central research question, "What is the importance and prevalence of the use of Neurofeedback in the field of counseling?"

Data Collection

According to the literature review, no previous studies have used surveys to examine the effectiveness of NFB, or neuroscience in general, in counseling research. Therefore, no appropriate survey existed. The data collection methods used in this study were developed entirely by the researcher, by using an online survey questionnaire. A survey questionnaire was sent to the ACA to be forwarded to members.

Online Survey

An online survey provides the advantage of being able to reach a wide geographic area and larger samples in comparison to interviews (Bourque & Fielder, 2003). The use of an online survey provided an easy and convenient method to reach the population selected. An online survey method is economical, provides a faster turnaround on data collection than mail surveys, and allows for the identification of attributes in a larger population within a small sample (Bourque & Fielder, 2003). Because of these attributes, an online survey was deemed to be an ideal format for this study.

The online survey created for the study includes questions created from research discussed in the literature review, and a 5-point Likert-type scale. A Likert-type scale survey is

simple to develop and commonly used (Salkind, 2003). Likert scales are widely used in attitude measurement research (Bordens & Abbott, 2008). A Likert scale is used to provide a series of statements to which participants can indicate degree of agreement or disagreement (Bordens & Abbott, 2008). The scale used for the survey was as follows: 1, strongly agree; 2, agree; 3, neutral; 4, disagree; and 5, strongly disagree. The Likert-type scale has been used by many previous researchers and provides a useful and uncomplicated method for data collection and analysis (Arnold, McCroskey, & Prichard, 2012). The present study used a Likert-type scale with descriptive analysis for comparing and contrasting the results from different counselors who have different levels of agreeing or disagreeing with the research question and sub-questions. The common use of the Likert-type survey may also have served to make participants feel more comfortable, and enabled them to provide realistic answers.

Instrumentation

The survey instrument is widely recognized as a tool to gather information for research study (Neuman, 2003). This survey was developed based on questions presented by the literature review. The survey also included questions that arose from the researcher's personal and professional experiences, in addition to the professional body of literature in the fields of neurosciences and NFB.

The survey has four sections: the first section is the introductory letter (Appendix A); the second section is the informed consent (Appendix B); the third section is the demographic questionnaire section of the survey instrument (Appendix C); and the fourth section is the substantive section of the survey instrument (Appendix D).

The survey instrument includes general information, background questionnaire, professional experience, client information (Appendix C). The purpose of this part of the survey is to collect data that will be analyzed and interpreted for descriptive explanation in the study.

Validity

This survey includes the personalized input of two professional counseling practitioners who are knowledgeable in treating clients via NFB. Changes to the instrumentation were based on the recommendations of these reviewers**.**

Internal Validity

The questions in this survey follow an open-ended format to allow participants to explain what factors and processes influence the efficacy of their NFT treatment. The survey also covers a wide range of topics to allow participants to voice their opinions and experiences on this subject. The goal of this instrument is to learn from practicing counselors who have incorporated new NFB techniques into their treatment; the instrument largely surveys opinions and personal experiences without searching for direct causation, which helps ensure internal validity.

External Validity

The sample set for this survey consists of any licensed ACA members. By keeping a broad sample set of professionals without limiting participation by field, specialization, geography, or other factors, the results of this study are likely to be applicable to other practitioners across the United States.

Data Analysis

The results of this study will be interpreted via descriptive statistics. Because of the nature of counseling and neuro-counseling, the goal of this study cannot be to draw a firm inference as to the applicability and efficacy of NFB in various situations. Rather, the data will

be analyzed so as to describe patterns in participants' responses that might suggest how and when NFB might be useful in treating clients.

Summary

The purpose of this quantitative descriptive study is to investigate American Counseling Association member's opinions of using NFB in the counseling field. This chapter presents the quantitative descriptive research method and describes the design, population, instrument, and data collection and analysis for the study. The descriptive research survey study is designed to explore the central research question: What are the factors and processes that influence treatment outcomes when NFB training is used in professional counseling? This study uses a survey to determine clinicians' experiences of using NFB. The survey allows the researcher to collect data from participants to discover influencing factors in their NFB treatments. A random sample of ACA members was obtained from the ACA Research Office.

Chapter Four: Results

This chapter outlines the results of the study. First, the research question will be reviewed. Second, a description of the participants will be discussed. Next, an analysis of participants' comments will be outlined. Finally, the statistic methods used to calculate outcomes will be discussed, as well as the outcomes of the analyses.

Research Question

This study explored the central research question, "What is the importance and prevalence of the use of Neurofeedback in the field of counseling?"

Demographics of the Participants

The survey was sent to the American Counseling Association (ACA) and 93 participants completed the survey. Fourteen of the surveys were incomplete and thus were not included in the analyses. Overall, 25.8 % were male (*n* =24), 59.1%were female (*n* =55). Race/ethnicity was reported as six African Americans, no responses of Alaskan Native, as well no response of American Indian, four Asian, four Hispanic/Latino, sixty-one Caucasian, and four other. In addition, the geographic region of participants' primary practice setting is twenty-two in the Eastern United States, twenty six in the Southern United States, 16 in the Midwestern United States, and 14 in the Western United States. The remaining two respondents did not answer this question.

Additional demographic information collected from participants focused on their educational background. The survey asked for the field of their degree and the highest degree completed. In respect to field of degree, 53 participants hold degrees in counseling, 7 in psychology, 2 in social work, 0 in psychiatry, 6 in counseling education and supervision, and 6 in other unspecified fields. Five of the respondents left this question unanswered. In terms of the

highest degree completed by participants, there are 55 Master's degrees, 14 Doctorate degrees, and 4 participants who responded other, while 6 did not answer the question. (see Table 2).

Finally, participants reported a wide array of professional licenses and certifications, and graduated from a range of different degree programs. Responses indicating the licenses and certifications held were: 21 Licensed Professional Counselors (LPC), 4 Licensed Marriage and Family Therapists (LMFT), 2 Licensed Clinical Social Workers (LCSW), 0 School Counseling Certification/Licenses, 1 Licensed Psychologist, 12 National Certified Counselors (NCC), 0 National Certified School Counselors (NCSC), and 23 others including: Certified Substance Abuse, Board Certified in Biofeedback and Neurofeedback, Associate Clinical Mental Health, CRC, DCB, NCC, LMHCA, BCN, Registered Nurse, Supervision Professional, Certified Thanatologist, and students. On the other hand, survey participants responded to a question assessing the type of degree program they graduated from by indicating that 40 graduated from programs for Clinical Mental Health, 0 from School Counseling programs, 9 from Psychology programs, 2 from Marriage and Family Therapy programs, 2 from Social Work programs, and 21 from other programs. (See Table 2). It is important to note here that some of these responses do not add up to 79 as some respondents answered with one or more of the available responses.

Table 2
Demographics Characteristics and education background of the participants

Demographics	**N**	**Valid Percentage**
Gender		
Male	24	30.4%
Female	55	69.6
Race /Ethnicity		
African American	6	7.6
Alaskan Native	0	0.0
American Indian	0	0.0
Asian	4	5.1
Hispanic/Latino	4	5.1
Caucasian	61	77.2
Other	4	5.1
Geographic Region		
Eastern United States	21	27.3
Southern United States	26	33.8
Midwestern United States	16	20.8.
Western United States	14	18.2
Field of Degree		
Counseling	53	71.6
Psychology	7	9.5
Social Work	2	2.7
Psychiatry	0	0.0
Counseling Educ. and Supervision	6	8.1
Other	6	8.1
Highest Degree		
Master's Degree	55	75.3
Doctorate	14	19.2
Other	4	5.5
Professional Certifications		
Licensed professional counselor(LPC)	21	33.3
Licensed Marriage and Family(LMFT)	4	6.3
Licensed Clinical Social Workers	2	3.2
(LCSW)	0	0.0
School Counseling Certification/licenses	1	1.6
Licensed psychologist	12	19.0
National certified Counselor(NCC)	0	0.0
National certified school	23	36.5
Counselor(NCSC)		
Other		

Table 2cont
Demographics Characteristics and education background of the participants

Education Program		
Clinical Mental Health	40	54.1
School Counseling	0	0.0
Psychology	9	12.2
Marriage and Family Therapy	2	2.7
Social Work	2	2.7
Other Programs	21	28.4

*****Note- not all responses add up to 79 due to missing answers or to participants choosing more than one option.

Professional Experiences

Participants were asked a wide array of questions regarding their professional practices and experiences in order to gauge their familiarity with and opinions on NFB Training. First, they stated whether they use NFB Training, and if so, the number of years they have been in NFB practice. Twenty-two participants stated that they currently use NFB Training, and 44 stated that they do not. The remaining 13 respondents did not answer this question. (See figure 1). Of those who completed the survey, 37 had indicated no years in NFB practice, 11 had done so for less than two years, 5 for three to six years, 6 for seven to 12 years, and 4 stated that they had been using NFB Training in their practices for 13 years or more. Four did not respond to this question.

The next questions explored how participants first became interested in NFB. The survey asked open-ended questions about how participants learned about NFB, and with which organizations they trained. None of the participants learned about NFB Training from Counselor Education Programs (CNED); 6 from Workshops/Seminars; 3 from practicum/internship experiences; 16 from research/reading; 5 from conferences; and 12 from other sources such as a classroom experience, colleagues, friends, biofeedback mentor on the job training and training just prior to the job, professional listserv discussion, supervisor while completing hours toward

licensing, work environment, and multiple sources. Twenty- two participants responded that they have not learned about NFB Training. Of the 79 participants, some indicated that they were trained at the Biofeedback Certification International Certification Alliance (BCIA). Others received training at the International Society for Neurofeedback and Research (ISNR), while several trained with EG Info, the EEG Institute, and EEG Spectrum. A few reported that they trained at the Association for Applied Psychophysiology and Biofeedback (AAPB), and some participants at Stens and Stress Therapy Solution.

The final series of sub questions focusing on professional experiences further examined the participants' opinions surrounding NFB Training. The specific questions addressed were: (1) I believe neuroscience and NFB courses should be required for the Counselor Education Program (CNED) – yes, agree or no, disagree. (2) In addition to NFB, do you also provide counseling/therapy services in your practice? – Yes or no. (3) If so, how many years have you been doing counseling/therapy?

Respondents stated that they believe Neuroscience and NFB courses should be a required part of the Counselor Education Program (CNED). Of the sample, 41 responded that they did agree and that courses in NFB training should be a required part of the program, while 24 responded that they did not agree. Next, 48 of the participants endorsed that yes, they do offer counseling/therapy services in their practice in addition to NFB Training. Of those who do provide counseling/therapy, 25 have done so for zero to two years, 10 for three to six years, 8 for seven to 12 years, and 21 for 13 or more years. These are a summary of the descriptive statistics of the therapists' professional experiences who participated in this survey.

Table 3.
Professional Experiences

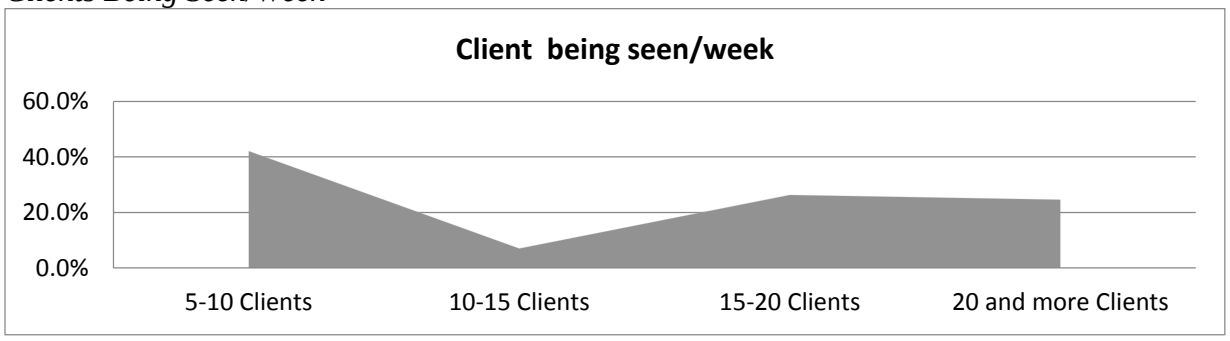
	N	Percentage
Numbers of years in NFB Training		
None	37	58%
0-2years	11	17.5
3-6years	5	7.9
7-12yeras	6	9.5
13 years or more	0	0.00
Learned about NFB		
Through CNED	0	0.00
Workshop/Seminar	6	9.0
Practicum/Internship Experience	3	14.1
Research/Reading	16	39.1
Conferences	5	46.9
Other	12	65.6
NFB required course for (CNED)		
Yes, agree.	41	63.1
No, disagree	24	36.9
Do you provide counseling services		
Yes	48	78.7
No	13	100.0
Years providing Counseling		
0-2 years	25	39.1
3-6 years	10	54.7
7-12 years	8	67.1
13 or more years	21	100.0

*****Note- not all responses add up to 79 due to missing answers or to participants choosing more than one option.

Clients' Information

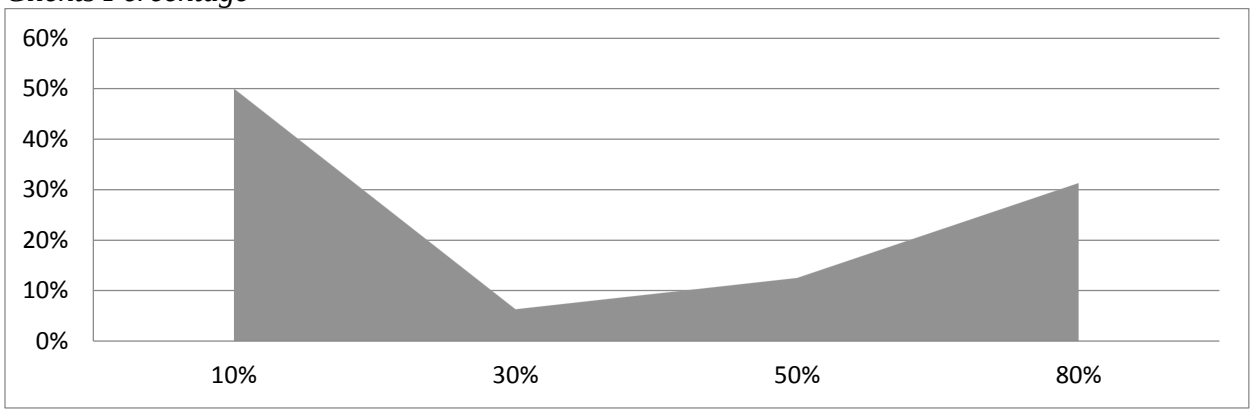
The last section of the introductory questions surveying participants concerns information about the clients who take part in NFB Training practices. When asked how many clients they have seen per week during the past year, 24 responded 5-10 clients. Additionally, 14 responded that they had seen twenty or more clients per week, while 4 responded that they had seen 15 to 20 clients per week. The last group of 15 participants reported they had seen 10 to 15 clients each week. (See Figure 1).

Figure1
Clients Being Seen/Week



The survey then investigated what approximate percentage of clients were exposed to NFB as a treatment. Only 16 replies indicated that ten percent of clients used this treatment, 2 replies stated that 50% used NFB Training, 4 reported that 30% of clients use NFB Training, while 10 practitioners reported that 80% of their clients are exposed to NFB as a treatment (See Figure 2).

Figure 2
Clients Percentage



Finally, participants were presented with seven different possible diagnoses, such as depression or anxiety, and asked what percentage of their clients presented symptoms associated with each diagnosis. The seven diagnoses were: depression, anxiety, autism spectrum disorder, Attention Deficit/Hyperactivity Disorder, bipolar disorder, sleep disorder, and traumatic brain injury. With results organized by the highest reported percentages, the sample confirmed that 51.68% of clients have a diagnosis of anxiety, 46.30% of depression, 32.14% of attention deficit/hyperactivity disorder, 24.59% of bipolar disorder, 15.44% traumatic brain injury, 16.65% autism spectrum disorder, and 42.34% sleep disorder. (Table 4)

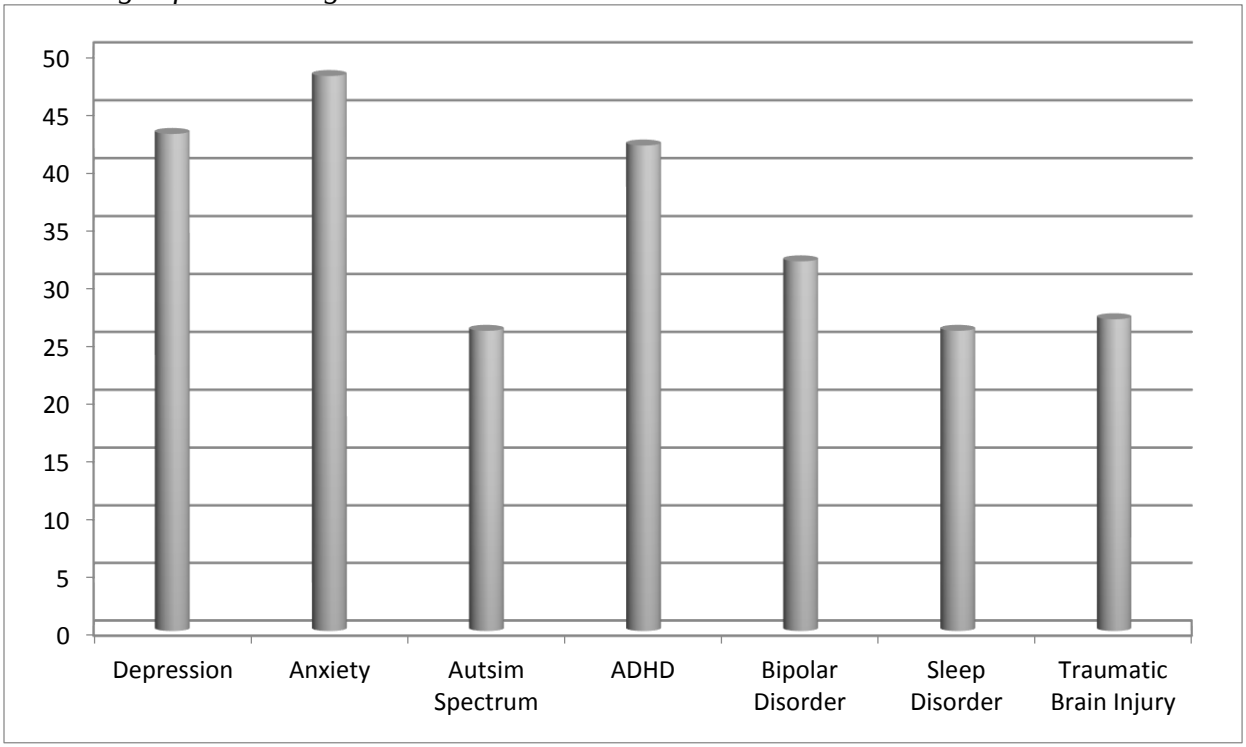
Table 4
Descriptive Statistic of Diagnoses

Diagnoses	N	Minimum	Maximum	Mean	Std. Deviation
Depression	43	0.00	100.00	46.30	24.32
Anxiety	48	0.00	100.00	51.69	27.01
Autism Spectrum	26	0.00	40.00	16.65	12.26
ADHD	42	1.00	100.00	32.14	25.97

Table 4 cont
Descriptive Statistic of Diagnoses

Sleep Disorder	26	5.00	91.00	42.35	24.58
Traumatic Brain Injury	27	0.00	60.00	15.44	16.67

Figure3
Percentage of Client Diagnoses



Analysis of Participant Comments

The final introductory question asked therapists: Please include any additional comments here, if needed. 16 participants made comments on this study.

Some participants viewed NFB as an integral part of their professional identities. One participant wrote,

> "I am licensed in the state of Virginia, but I work overseas. I combine NFB with counseling with almost all my clients because I think that NFB helps to make the brain more flexible, so that people are able to incorporate cognitive behavioral concepts, build relationships and attachments, and make changes more easily if NFB is combined with counseling. I also work with a good percentage of adopted children with attachment

> issues, and have seen good progress with these children. One had symptoms of schizophrenia, but has been able to attend university and do well."

Another participant wrote,

> "Learning NFB is a long process but a worthy process."

One more participant wrote,

> "The clients seen for depression, anxiety, ADHD, enjoyed dramatic, permanent improvement in their symptoms."

Two participants commented that NFB was effective in treating diagnoses not mentioned in the study. One of these noted, "I have also seen a number of clients with fibromyalgia. This condition is dramatically improved by treatment with NFB." The second indicated that about 7% of their NFB patients have psychotic disorders, and about 30%, a "high incidence," have PTSD. Overall, participants commented that NFB was an effective treatment for the following diagnoses: psychotic disorders, PTSD, trauma in general, childhood trauma, ADHD, depression, anxiety, bipolar disorder, and fibromyalgia.

One participant shared their personal experience with NFB. This person started treating clients with fibromyalgia symptoms because of their own personal experience.

> "I have struggled with fibromyalgia for over 30 years, and could hardly function even on medication prior to doing NFB. Three months after I began NFB therapy, I was off of all prescription medication, was sleeping deeply at night and woke rested and clear minded. I felt so good that I went back to school and completed my bachelor's degree, and right on to grad school to earn my master's degree. NFB changed my life."

One participant accepted NFB's role within counseling, but were hesitant about inexperienced practitioners without proper training. That participant wrote:

> "Proper techniques should be reinforced and use BCIA or other board certification programs as most states do not have a specific regulation for biofeedback or NFB practices. We see many people who are practicing without using QEEGs and proper equipment."

Another recommendation from a participant read,

> "I believe other forms of biofeedback should also be included. Heart rate variability training can be a stand alone treatment for anxiety and panic. Heartmath and InnerBalance are inexpensive modalities that are very well researched."

Overall, the comments of participants reported positive opinions about NFB in a counseling setting. They shared their personal experiences regarding their own training in NFB, the clients they see and which diagnoses responded the best to NFB treatment, and how NFB changed their life. The recommendation to ensure proper training before using NFB equipment is particularly salient to this study. It is noteworthy that no participants commented negatively against the practice of using NFB alongside counseling.

Data Analysis

The next portion of the survey measured participants' opinions based on their experiences using NFB in a counseling setting. This portion was divided into three main parts: perception of neuro-counselor-counseling, perception of neuroscience and the anatomy of the brain, and perception of NFB.

Descriptive statistics show that participants of this study generally had positive perceptions of NFB Treatment. Response choices on the survey of the study range from (1) strongly agree, (2) agree, (3) unsure, (4) disagree, and (5) strongly disagree. The first question of section one asked whether NFB training fits into a counseling wellness perspective, helping clients achieve both health and well-being. This question had a mean score of 1.87. The second question asked if there was enough research on the use of NFB in counseling, and this question had a mean score of 2.54. The third question explored whether respondents felt NFB had reduced clients' reliance on medication. Participants answered with a mean score of 2.43. The fourth question inquired if ethics guidelines for practicing NFB conflict with the ACA code of ethics. The mean score of this question was 2.25. The fifth question asked whether counseling education

programs should include courses about NFB, and here respondents answered with a mean score of 1.65. Finally, the sixth question asked whether the use of NFB as a counseling tool is still experimental. The mean score was 3.06. The total number of responses are presented in Table 5.

Table 5
Descriptive Statistic for Perception of neuro-counselor-counseling

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)	N	Mean	Std. Deviation
Q1: Neurofeedbak Training fits into a counseling wellness perspective, helping clients achieve both health and well-being.	22 42.3%	15 28.8	15 28.8%	0 0.00%	0 0.00%	52	1.87	.841
Q2: There is not enough research on the use of Neurofeedback training in counseling.	11 21.2%	15 28.8%	17 32.7%	5 9.65%	4 7.7%	52	2.54	1.163
Q3: Neurofeedback Training has reduced some of my clients' reliance on medication treatment.	13 26.5%	8 16.3%	25 51.0%	0 0.00%	3 6.1%	49	2.43	1.080
Q4: As a participant, ethics guidelines for the practice of NFB do not conflict with ACA Code of Ethics.	17 33.3%	6 11.8%	26 51.0%	2 3.9%	0 0.00%	51	2.25	.977

Table 5 cont
Descriptive Statistic for Perception of neuro-counselor-counseling

Q5: Counseling Education Programs should include courses about psychophysiology.	26 50.0%	20 38.5%	5 9.6%	0 0.00%	1 1.9%	52	1.65	.814
Q6: The use of Neurofeedback Training as a counseling tool is still experimental.	2 3.8%	18 34.0%	16 30.2%	9 17.0%	8 15.1%	53	3.06	1.134

The second section focused on perceptions of neuroscience and the anatomy of the brain. The first question asked whether there should be a professional journal specific to neuro-counseling in the counseling profession. The mean score was 1.88. The second question regarded whether respondents felt that the language of neuroscience is difficult to understand. Respondents gave a mean score of 2.98. The third question asked if participants felt they could seek assistance regarding the code of ethics for NFB practice, and here participants replied with a mean score of 2.69. Fourth, participants were asked whether understanding the brain helped them better understand their clients. Reponses had a mean score of 1.54. Fifth, the question asked whether counseling students should take courses in neurosciences and neuroanatomy. This question had a mean score of 1.92. The last question was whether neuroscience is an essential factor in the future of counseling. Respondents gave a mean score of 1.90. The full details of all responses are included in Table 6 below.

Table 6
Descriptive Statistic for Perception of neuroscience and the anatomy of the brain

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)	N	Mean	Std. Deviation
Q1: There should be professional journal and publications specific for neur-cousneling in the counseling profession.	18 34.6%	23 44.2%	10 19.2%	1 1.9%	0 0.00%	52	1.88	.784
Q2: The language of neuroscience is difficult to understand.	1 2.0%	18 35.3%	16 31.4%	13 25.5%	3 5.0%	51	2.98	.969
Q3: It is possible for me to seek assistance for code of ethics for NFB practice.	4 7.8%	12 23.5%	32 62.7%	2 3.9%	1 2.0%	51	2.69	.761
Q4: Understanding brain functioning helps me better treat my clients.	28 53.8%	20 38.5%	4 7.7%	0 0.00%	0 0.00%	52	1.54	.641

Table 6 cont

Descriptive Statistic for Perception of neuroscience and the anatomy of the brain

Q5: Counseling students should take courses in neur**o**science and neuroanatomy.	20 39.2%	19 37.3%	8 15.7%	4 7.8%	0 0.00%	51	1.92	.935
Q6: Neuroscience is an essential factor for the future of counseling.	19 37.3%	21 41.2%	8 15.7%	3 5.9%	0 0.00%	51	1.90	.878

The third and last section of the survey was about perceptions of NFB in general. The first question asked whether one organization should be responsible for standardized regulation of professional NFB throughout the United States. The mean response was 2.51. The second question asked participants if they felt comfortable using QEEG to guide NFB treatment. Participants responded with a mean reply of 3.10. The third question inquired if participants felt comfortable using clinical assessment tools such as self-report and a clinical interview, and here the mean reply was 1.96. The fourth question asked if participants were comfortable using standardized assessment tools such as CBCL, administered psychological evaluation. The mean reply was 2.45. Fifth, participants were asked if they have access to supervision and consultation with other NFB professionals. The mean reply for this question was 2.65. Sixth, participants answered whether they have noticed significant decrease in clients' symptoms when NFB is combined with counseling, compared to treating symptoms with counseling alone. Here, the mean reply was 2.43. Full responses are detailed in Table 7.

Table 7
Descriptive Statistic for Perception of Neurofeedback

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)	N	Mean	Std. Division
Q1: One organization should be responsible for standardized regulation of professional NFB throughout the United States	13 25.5%	11 21.6%	19 37.3%	4 7.8%	4 7.8%	51	2.51	1.189
Q2: As a participant, I am comfortable using QEEG to guide NFB treatment.	5 10.2%	10 20.4%	17 34.7%	9 18.4%	8 16.3%	49	3.10	1.212
Q3: As a participant, I am comfortable using clinical assessment such as self-report and clinical interview	20 40.0%	16 32.0%	11 22.0%	2 4.05	1 2.0%	50	1.96	.989
Q4: As a participant, I am comfortable using standardized assessment tools such as CBCL, administered psychological evaluations.	11 22.4%	11 22.4%	22 44.9%	4 8.2%	1 2.0%	49	2.45	1.001
Q5: I have access to supervision and consultation with other NFB professionals.	15 30.6%	8 16.3%	11 22.4%	9 18.4%	6 12.2%	49	2.65	1.408

Table 7 cont
Descriptive Statistic for Perception of Neurofeedback

Q6: I have noticed significant decrease in clients' symptoms when Neurofeedback Training is combined with counseling, as compared to treating symptoms with counseling alone.	13 26.5%	10 20.4%	21 42.9%	2 4.1%	3 6.1%	49	2.43	1.118

Summary

This chapter restated the research question, and described the participants' demographics, educational background, professional experiences, and client base. The information presented in this chapter summarized the participants' comments and feedback. Finally, this chapter analyzed data, stating the results of the study. The following chapter will discuss these results.

Chapter Five: Discussion

This final chapter will present and analyze the results of the study. First, the researcher will briefly paraphrase the purpose of the study as it was set forth in chapter one. More significantly, the researcher will detail the results of the study while discussing and analyzing the implications of these results. The section covering results is divided into two parts. First, a discussion of major findings is presented. This is followed by a summary of the statistical findings. After this analysis of results, the researcher explores possible limitations of the study. This chapter will end with the implications of the study's results, along with recommendations for future research for interested readers.

Purpose of Study

The purpose of this study seeks to explore the importance of and prevalence of the use of NFB in the field of counseling. As laid out in chapter two's review of the literature, targeted use of NFB during treatment can result in more effective diagnoses for clients of counselors. Once a correct diagnosis has been made, the survey of this study attempted to determine therapists' opinion regarding which diagnoses can be most effectively treated with NFB. In addition to helping to make a good diagnosis, this study will examine whether NFB can be used as an effective treatment in therapy. The purpose of the study is to determine whether use of NFB can help lessen clients' dependence on psychiatric medications. This would be beneficial in that it could bring down the number of psychiatric patients who are repeatedly admitted to hospital emergency rooms by providing long-term solutions to clients' symptoms.

The overall purpose of this research was to explore the attitudes among counselors and counseling educator members of the American Counseling Association (ACA) regarding the importance of and prevalence of the use of NFB in the field of counseling. It asks members of

the ACA whether courses on Neuroscience and NFB should be included in the Counseling Education Program, and whether these techniques are a beneficial part of their counseling practices. This chapter will explore all of these questions and facts by analyzing the results below.

Discussion of Major Findings

In order to discuss the major findings of the study, the researcher will begin by analyzing the background of participants. Study participants were predominantly white, with 61 of 93 respondents identifying as Caucasian. One aspect of the study is the wide range of professional experiences and backgrounds that contributed to the results. Professional backgrounds include counseling, psychology, social work, counseling education and supervision, and six other fields specified by participants. Interestingly, no respondents came from the field of psychiatry.

Respondents also came from a variety of different degree programs including School Counseling, Psychology, Marriage and Family Therapy, and a remarkable 23 other degrees written in by individuals. As an important element of the responses, 40 participants hold high-level degrees in Clinical Mental Health. The majority of participants, 21 respondents, are Licensed Professional Counselors, and 27 other professional licenses or certifications are represented.

The variety of background characteristics of the sample group helps to make the results more interesting, and adds importance to opinions that remained similar among individuals with disparate professional histories. Even though a wide range of backgrounds is represented, 53 participants – the majority of respondents – are professional counselors who carry counseling degrees. Fifty-five of the 93 participants have a master's degree, another 14 hold Doctorates, and 21 are Licensed Professional Counselors. The large number of experienced counselors who

responded to this study adds to the reliability of the results, as the study aimed to weigh counselors' opinions on NFB.

As an important conclusion of this study, NFB seems to be a relatively new treatment. Surprisingly, only 44 of participants do not use Neurofeedback training. One possible explanation for this finding may be that therapists are not familiar with such techniques. More than half of the sample indicated they do not use it, and a correlating number report that they have spent no years in NFB practice. The majority of professionals who do use NFB seem to have basic experience. Repeated responses indicate that they are interested in learning about and using NFB, but very few participants have practiced NFB for a long period of time. Additionally, as an important finding, not a single participant reported learning about NFB through Counseling Education and Supervision (CNED) programs. Only 3 reported learning about NFB from practicum or an internship experience. On the other hand, most participants had learned about NFB either through research and reading, conferences, or workshops and seminars.

The participants in this study strongly agree that CNED programs should consider adding courses on NFB techniques as a part of their curriculum. As an interesting result, an overwhelming number of participants opined that neuroscience and NFB courses should be required for the CNED.

Finally, information about the client base of respondents will be reviewed. On one end of the spectrum, 24 participants have small practices with only 5 to 10 clients, while 14 participants work in large practices with more than 20 clients. Furthermore, there was an interesting report of what percentage of clients use NFB treatments each week, with 10 participants reporting that an astounding 80% of their clients use NFB weekly. However, a similar number reported only using NFB weekly for about 10% of their clients. According to these responses, the researcher can

discern two groups of participants: one with years of experience and a very high percentage of NFB use, and a second group of new comers to the field. Another group of findings relevant to clients was what diagnoses NFB is used to treat. Unsurprisingly, anxiety was the most diagnosed disorder treated by NFB, followed by depression.

This section has reviewed findings in the study's introductory questions, including the personal and educational background and the professional experiences of respondents, as well as the basics of respondents' client information. A summary of the findings from the survey portion of the study follows.

Summary of Statistical Findings

The survey section of this study is divided into three parts. The first examines respondents' perceptions of neuro-counseling, the second concerns the concepts of neuroscience and the anatomy of the brain, and the last section regards NFB techniques. As a reminder, each part has six statements, and participants were asked for their level of agreement with each statement.

Findings from Survey Regarding the Perception of Neuro-Counseling

This section inquired about participants' opinions on mixing NFB with counseling. The first question asked whether NFB training fits into a counseling wellness perspective. Twenty-two participants strongly agreed with this statement, and no participants disagreed or strongly disagreed, supporting the central question of the study.

The second question focused on whether there is enough research on topics of NFB in professional counseling. This question drew a wide variety of responses. 11 participants strongly agreed that there is not enough research, 17 were unsure, and 4 strongly disagreed, indicating they strongly feel there is enough research. However, this percentage of replies that disagree or

strongly disagree could result from individuals who are already very familiar with NFB and who believe research already strongly supports its practice.

Interestingly, when asked whether NFB had reduced some clients' reliance on medication treatment, 25 respondents were unsure whether they agreed or disagreed with this statement, 21 agreed or strongly agreed, and only 3 strongly disagreed. Again, this finding supports the foundational premise of the study, indicating that NFB combined with counseling holds promise to help clients use less medication.

"Ethics guidelines for practicing NFB do not conflict with the ACA code of ethics," was the next area of concern for the study. The distribution of answers for this question was similar to the distribution regarding clients' medication use: 23 agreed or strongly agreed, 26 were unsure, and only 2 disagreed. This could be a suggestion that the ACA might consider updating their code of ethics to meet the new demands of NFB technology.

An important question for the study follows. It was related to Counseling Education program, asking whether CNED programs should include courses about psychophysiology. Crucially, 26 responses strongly agreed and 20 agreed, meaning 46 participants agree that the CNED program would benefit from adding NFB to its curriculum. On the other hand, only 1 participant disagreed, while 5 remained unsure.

Finally, participants were asked whether they felt that NFB is still an experimental counseling tool. As could be expected, results held an opposite curve from previous questions. Here, 17 participants disagreed or strongly disagreed, and only 2 strongly agreed.

Findings from Survey Regarding Neuroscience and the Anatomy of the Brain

The section of the survey focusing on the anatomy of the brain intended to ask about participants' familiarity with the language of neuroscience and their opinion on the accessibility

of the neuroscience fields to professional counselors. In the end, the purpose was to determine whether respondents felt that understanding their clients' brains helped them to better understand their clients.

Almost all respondents thought there should be professional journals and publications specific for neuro-counseling within the counseling profession: 33 replied that they agreed, 10 were unsure, and only 1 participant disagreed.

However, participants were not as unanimous regarding whether the language of neuroscience is difficult to understand. Here, responses stayed toward the middle, with 16 unsure responses, 18 people who agreed, and 13 who disagreed. Only one person strongly agreed. This outcome could mean that, based on responses, the language of neuroscience is not difficult for many counselors to understand.

Another concern about the code of ethics for NFB practice, specifically asking whether participants are able to seek assistance about ethics, follows. The majority of respondents were unsure, and only one strongly disagreed. This could be for a variety of reasons, including ambiguity over the question, or participants' lack of experience on this particular issue.

A central question in this study is whether understanding the anatomy of the brain helps counselors better understand clients. When asked this question, not a single participant disagreed with the premise that understanding brain functioning helps them better treat their clients. On the contrary, 28 strongly agreed and 20 agreed, meaning almost all respondents agreed with this statement. Only 4 were unsure. These results strongly support the research question.

The next set of results mirrors data from the previous question, as well as from a related question from the first section of the survey. When asked whether counseling students should take courses in neurosciences and neuroanatomy, 39 agreed or strongly agreed. Only 4 disagreed.

Surprisingly, no one strongly disagreed. This is consistent with results from the previous question regarding the CNED curriculum, and it supports the premise that understanding neuroanatomy helps counselors to understand clients.

As a last question for this section participants were asked whether neuroscience is an essential factor for the future of counseling. Again, the response was overwhelmingly positive. 19 people strongly agreed, 21 agreed, and only 3 disagreed. Interestingly, here also no participant strongly disagreed. This supports this researcher's foundation and the findings of the literature review that NFB is a new field, of great interest for future research.

Findings from Survey Regarding Neurofeedback Techniques

The last section of the survey covered more concrete aspects of using NFB in a counseling setting. The researcher suggested that one organization should be responsible for standardized regulation of professional NFB throughout the United States. Thirteen participants strongly agreed with this suggestion and 11 agreed. Nineteen were unsure. 8, however, disagreed.

The next series of questions related to how comfortable participants felt with different measurement tools. Only 5 participants felt very comfortable using QEEG. However, 20 were very comfortable using clinical assessments and 11 were very comfortable using standardized assessment tools. 16 were comfortable using clinical assessments, 11 were comfortable using standardized assessment tools, and 10 participants agreed that they were comfortable using QEEG. Additionally, many respondents were unsure whether they felt comfortable using these tools: 22 were unsure about standardized assessment tools, 17 were unsure about using QEEG, and 11 were unsure about using clinical assessments. As for participants who disagreed and stated they were not comfortable or very uncomfortable using these tools, the most, 17 disagreed

or strongly disagreed about using QEEG, while 5 disagreed or strongly disagreed about using standardized assessment tools, and lastly only 3 disagreed about using clinical assessment tools in their clinic. Clearly, QEEG is the area that made most respondents uneasy.

There was a balance of responses about whether participants have access to supervision or consultation with other NFB professionals. Fifteen people strongly agreed with this statement, while another Fifteen either disagreed or strongly disagreed. This supports the researcher's observation that participants might belong to two groups: practitioners who are new to NFB, and practitioners who have a long history in NFB with access to supervision and consultation.

To summarize the central question of this study, the researcher asked participants whether they noticed significant decrease in clients' symptoms when NFB is combined with counseling, especially compared to treating symptoms with counseling alone. The findings of this question are strongly encouraging to using NFB in the counseling field. Thirteen respondents strongly agreed – and 10 agreed – that they have noticed their clients' symptoms significantly decrease when NFB is combined with traditional counseling techniques. Moreover, only 2 disagreed and 3 strongly disagreed. The total number of participants who disagreed with this sentiment is 5 out of 93, amounting to a positive outcome for this study and supporting the efficacy of NFB. Again, responses to this survey strongly indicated that NFB is a bright possibility for the future of counseling. Overall, the result of this study is that both counselors and counselor educator members of ACA generally have positive perceptions of NFB.

Limitations

There are some limitations in what conclusions can be drawn from this study. The choice to use a survey allowed for acquiring large amounts of information relatively quickly and accurately, however, all conclusions must be considered within the context of limitations that

arise from the nature of a survey itself. The nature of a study based on a voluntary survey is that results are open, and the participants are randomized and self-selected; the researcher exerted no control over who responded to the survey. The researcher attempted to mitigate this limitation in the cover letter to her survey, which invited "any professional who uses NFB Training (NFB) to participate in a research study regarding your beliefs and practices related to the use of NFB in counseling." Despite this invitation, however, not all participants were professional counselors.

In order to ensure consistency of training and grading, participants were chosen from only one counselor organization, the ACA. This sampling plan controlled the sample size. Were the study to be conducted on a larger scale, sample size could possibly affect outcomes differently.

Third, out of the therapists who did participate in the study, some of them failed to complete the survey. This created gaps in the data, and without these gaps results could potentially have been different. Accordingly, this study includes some missing data, caused by participants occasionally leaving questions blank. This is another limitation inherent in the nature of a survey.

This researcher's literature review found that most writing on the topic of NFB is by psychologists, not counselors. Because research by psychologists formed the foundation for a survey that was aimed at counselors, it is possible that some aspects of the survey do not fit perfectly with counselors' experiences. In fact, one participant commented, "[t]he survey did not allow for an answer which I wanted to provide." Another participant who is a counselor stated, "some of the questions were difficult to answer and didn't fit with my experience. Also, I would like to add that NFB is a very broad, umbrella term that encompasses a multitude of interventions. Finally, NFB can be described as applied neuroscience, but there are many other

ways in which neuroscience can be applied in the counseling field." This is a limitation that can only be remedied by more research into counselors' use of NFB: more research by counselors is necessary to examine the specific nuances of what types of NFB are of the most use in counseling.

One more limitation also comes from the nature of the issue being researched. As this is one of the first studies to explore the use of NFB in the counseling field, more research should be completed to study whether the trends reported here are replicable. These are the limitations that must be considered while discussing the implications and recommendations of the study.

Implications and Recommendations

The findings of this study have multiple implications for the counseling profession. The first implication is that NFB can be an effective treatment, when combined with counseling, to combat the symptoms of anxiety, ADHD, and depression.

Because the outcomes of this study showed that NFB can be an effective treatment to utilize in counseling field, it is suggested that counselor educators consider NFB training when setting guidelines for the counseling courses. This implication could be salient for faculty who teach in counseling education program.

Another area for further research concerns professional ethical codes and the ACA's ethical guidelines. It is possible that if therapists could, they would refer to their professional ethical codes for direction when they are conflicted about NFB techniques. However, since the ACA could improve ethical guidelines that address issues of neuroscience, therapists make a decision without this guidance. According to the data from this study, 51% of respondents were unsure how ACA codes of ethics interacted with NFB guidelines of practice. This indicates that current ACA Ethical Standards are not up to date on the use of emerging NFB technologies. New

research to ask therapists their recommendations on updating the ACA Ethical Standards to address issues related to the practice of NFB is required. In addition, the ACA itself should consider providing more resources for practitioners who use NFB in the counseling profession. Supervision.

The findings of this study add to the growing body of literature on the changing use of NFB in counseling. However, because this study was preliminary in nature, the following recommendations for further research are suggested. First, research is needed to identify effective intervention strategies. Specifically, further research could identify which forms of NFB are the most effective at treating different diagnoses. Second, research which clarifies how therapists' values, attitudes, fears, and biases may influence their professional use of NFB would be helpful. Third, research evaluating how mental health treatment professionals are being trained to meet the challenging new technologies of Neuroscience and NFB is necessary. Any such studies could serve as the impetus for further training on NFB. Finally, researchers who complete dissertation studies on any of these topics or on related topics should consider submitting their studies for publication. This would help remedy the lack of sources on these topics.

Summary and Conclusion

The researcher explored the importance of and prevalence of the use of NFB in the counseling field. The paper contains an overview the concept of a neuro-counselor, including an overview of the definition of mental health professionals, biofeedback, NFB, neurotherapy, and neuroscience; the history of these fields; and how they apply to contemporary counseling professionals. A literature review outlines research about NFB and biofeedback in mental health care since the 1970s. The importance of the literature review is to demonstrate the long history of

academics insisting that counselors must understand neuroanatomy, or the structure of the human brain, in order to understand that changes in brain patterns occur and are associated with positive changes in physical, emotional, and cognitive states. Next, the researcher outlined current sources' work on NFB training and its relationship with increased self-awareness, and how it is an important concept in the counseling profession. A section reviewing current studies on clinical experience found that recent research has determined NFB training to be an effective treatment for clients with ADHD, depression, anxiety, and substance abuse disorders.

The methodology of this study was survey-based, using a quantitative descriptive survey research method. Descriptive statistics helped the researcher analyze survey results. The sample set consisted of 93 participants from the American Counseling Association (ACA)'s membership. The benefit of sending this survey to the ACA's membership base was that participant responses allowed the researcher to learn that use of NFB is growing among counseling professionals today. In fact, the majority of respondents were in the field of counseling, with degrees in Clinical Mental Health, and certifications as Licensed Professional Counselors. The results of this study indicate that a growing number of professionals see the benefit of using neuroscience in their counseling practices. This study makes recommendations on how educational requirements and ethical guidelines might be updated to reflect this important new trend.

More specifically, repeated responses indicate that participants are interested in learning about and using NFB. Respondents overwhelmingly stated that they believe Neuroscience and NFB courses should be a required part of the Counselor Education Program (CNED). In addition, participants commented that NFB was an effective treatment for the following diagnoses: psychotic disorders, PTSD, trauma in general, childhood trauma, ADHD, depression,

anxiety, bipolar disorder, and fibromyalgia. Finally, findings strongly support the proposition that NFB, combined with counseling, can reduce some clients' reliance on medication treatment. Overall, based on responses to the questions, participants appeared to agree that understanding neuroscience helps them better treat their clients

Overall, the comments of participants reported positive opinions about neuroscience in a counseling setting. Participants shared personal experiences regarding their own training in NFB, and which of their clients' diagnoses responded the best to NFB treatment. No participants commented negatively against the practice of using NFB alongside counseling. Interestingly, the researcher even received several e-mails supporting this area of research and demonstrating interest in the field. In sum, the results of this study were overwhelmingly positive in regards to NFB treatment as a new and growing area of research for counselors.

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Appendix A: INTRODUCTORY LETTER

Dear Participants:

I am conducting a study for my dissertation entitled "A Descriptive Study of the Use of Neurofeedback in Counseling." As a doctoral level student in counseling, I would like to invite any professional who uses ***Neurofeedback Training (NFB)*** to participate in a research study regarding your beliefs and practices related to the use of neurofeedback in counseling.

I have developed a survey of counselors' perceptions of using neurofeedback perspectives when working with clients. I plan to use data collected from this survey to better understand best practices for counselors and barriers that prevent counselors from utilizing a neurofeedback approach. I intend to share the information through scholarly presentation and publication.

The survey will take approximately 10 minutes to complete. All information provided is anonymous as there will be no way to identify you once you have submitted your answers. Your participation in this study is entirely voluntary and you may withdraw your consent and terminate participation without consequence at any time.

Please direct any questions or concerns about this study to the principal researcher.

Thank you in advance for your participation. Your time is greatly appreciated.

Sincerely,

Khwlah J Alansari, MS
Kristin Higgins, Ph.D LPC
University of Arkansas
College of Education and Health Professions
Department of Counselor Education

Compliance Contact Person:
Ro Windwalker, CIP
Office of Research Compliance
109 MLKG
University of Arkansas
Fayetteveille, AR 72701
479-575-2208
irb@uark.edu

Appendix B: INFORMED CONSENT

Investigators: Khwlah J Alansari, MS
XXX-XXX-XXXX
xxxxxx@xxx.com

Kristin Higgins, Ph.D LPC
XXX-XXX-XXXX
kkhiggi@uark.edu

***Description*:** The purpose of this study is to measure the effect of using Neurofeedback Training (NFB) in the counseling field. As a participant of this study, you will be asked to compete a demographic questionnaire and complete the questionnaires.
Risks and benefits: The benefits include increasing the knowledge base related to instruction in the counseling profession. There are no anticipated risks to participating in the study.
Voluntary Participation: Participation in this study, defined as completion of the demographic questionnaire and the survey, is completely voluntary**.** There will be no penalty or negative consequences if you choose not to participate or choose to stop participation at any point during the survey.
Confidentiality: All information will be recorded anonymously and kept in a secured or password protected location. Results from this research will be reported as aggregate data only and no individually identifying information will be reported.
Survey Link:
If you have any questions concerning the research study, please contact me at XXX-XXX-XXXX. I know that the researcher listed above will be able to answer any questions I may have. If, at any time, I feel my questions have not been adequately answered, I may request to speak with the University of Arkansas Institutional Review board Protections of Human Subjects (Attention: Rosemary Ruff, ADMN 210, 479-575-2208, rruff@uark.edu).

Sincerely,
Khwlah J Al-ansari
Doctoral Candidate

APPENDIX C:

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

December 15, 2014

MEMORANDUM

TO:	Khwlah Alansari Kristin Higgins
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	14-11-312
Protocol Title:	*The Effects of Neurofeedback Training in the Field of Counseling Professionals*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 12/15/2014 Expiration Date: 12/14/2015

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 60 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

210 Administration Building • 1 University of Arkansas • Fayetteville, AR 72701
Voice (479) 575-2208 • Fax (479) 575-3846 • Email irb@uark.edu

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

April 16, 2015

MEMORANDUM

TO:	Khwlah Alansari Kristin Higgins
FROM:	Ro Windwalker IRB Coordinator
RE:	PROJECT MODIFICATION
IRB Protocol #:	14-11-312
Protocol Title:	*The Effects of Neurofeedback Training in the Field of Counseling Professionals*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 04/15/2015 Expiration Date: 12/14/2015

Your request to modify the referenced protocol has been approved by the IRB. **This protocol is currently approved for 93 total participants.** If you wish to make any further modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

Please note that this approval does not extend the Approved Project Period. Should you wish to extend your project beyond the current expiration date, you must submit a request for continuation using the UAF IRB form "Continuing Review for IRB Approved Projects." The request should be sent to the IRB Coordinator, 109 MLKG Building.

For protocols requiring FULL IRB review, please submit your request at least one month prior to the current expiration date. (High-risk protocols may require even more time for approval.) For protocols requiring an EXPEDITED or EXEMPT review, submit your request at least two weeks prior to the current expiration date. Failure to obtain approval for a continuation *on or prior to* the currently approved expiration date will result in termination of the protocol and you will be required to submit a new protocol to the IRB before continuing the project. Data collected past the protocol expiration date may need to be eliminated from the dataset should you wish to publish. Only data collected under a currently approved protocol can be certified by the IRB for any purpose.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

Appendix D: DEMOGRAPHICS INVENTORY

Neurofeedback Provider Demographic Information

I. General Information:

A-Gender:

- Male
- Female

B- Race/Ethnicity (Please check one)

- African American
- Alaskan Native
- American Indian
- Asian
- Hispanic/Latino
- Caucasian
- Other, please specify

C- Geographic region of primary practice setting

- Eastern United States
- Southern United States
- Midwestern United States
- Western United States

II. Background Questionnaire

A-In what field is your degree?

- Counseling
- Social Work
- Counseling Education and Supervision
- Psychology
- Psychiatry
- Other (Please specify):

B- Highest degree completed:

- Master's Degree
- Doctorate
- Other (please specify):

C-What type of degree program did you graduate from?

- Clinical Mental Health
- School Counseling
- Psychology
- Marriage and Family Therapy
- Social Work
- Other, please specify

D- Do you hold a professional license and or certification? (Please select all that apply*)*

- Licensed Professional Counselor (LPC)
- Licensed Marriage and Family Therapist (LMFT)
- Licensed Clinical Social Workers (LCSW)
- School Counseling Certification/ License
- Licensed Psychologist
- National Certified Counselor (NCC)
- National Certified School Counselor (NCSC)
- Other, (please specify)

1I1. Professional Experience:

A-Are you currently using Neurofeedback Training in your practice?

- Yes
- No

B-Number of years in practicing Neurofeedback training:

- None
- 3-6 years
- 13 or more
- 0-2 years
- 7-12 years

C- I learned about Neurofeedback Training through: (Check all that apply)

- Counselor Education Program (CNED)
- Workshop/ Seminar
- Practicum/Internship Experience
- Research/ Reading

- Conferences
- Other, (please specify)
- I have not learned about Neurofeedback Training

D-Please list the organizations where you received training in the Neurofeedback field?

_____

E-I believe a Neuroscience and Nerofeedback course should be a requirement for the Counselor Education Program (CNED)

- Yes, agree.
- No, disagree.

F- In addition to Neurofeedback, do you also provide counseling /therapy services in your practice?

- Yes
- No

G- If so, how many years have you been doing counseling/ therapy?

- 0-2 years
- 3-6 years
- 7-12 years
- 13 or more

III. Client Information:

A-How many clients have you seen peer week, during this past year?

- 5-10 clients
- 10-15 clients
- 15-20 clients
- 20 or more clients

B- What percentage of your clients per week, do you use Nerufeedback as treatment?

- 10%
- 30%
- 50%
- 80%

C-If possible, could you please give an estimate of the percentage of your clients with the following presenting problems:

Depression % Anxiety % Autism spectrum %
Attention Deficit/Hyperactivity Disorder % Bipolar Disorder %
Sleep disorder % Traumatic Brain Injury %
Other common presenting problems:

Please include any additional comments here, if needed:

_____

_____

_____

_____

Appendix E

1- <u>Perceptions of Neuro-counselor- Counseling</u>

Please indicate your level of agreement with each statement. Please consider (1= strongly agree, 2=agree, 3=unsure,4=disagree,5=strongly disagree).

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)
Neurofeedback Training fits into a counseling wellness perspective, helping clients achieve both health and well-being.					
There is not enough research on the use of Neurofeedback Training counseling.					
Neurofeedback Training has reduced some of my clients' reliance on medication treatment.					
As a participant, ethics guidelines for the practice of NFB do not conflict with ACA Code of Ethics.					
Counseling Education Programs should include courses about psychophysiology.					
The use of Neurofeedback Training as a counseling tool is still experimental.					

2- Neurosciences and the Anatomy of the Brain

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)
There should be professional journal and publications specific for neur-cousneling in the counseling profession.					
The language of neuroscience is difficult to understanding.					
It is possible for me to seek assists for code of ethic for NFB practice.					
Understanding brain functioning helps me better treat my clients.					
A counseling students should take courses in neur**o**science and neuroanatomy.					
Neuroscience is an essential factor for the future of counseling					

3- Neurofeedaback

	Strongly Agree (1)	Agree (2)	Unsure (3)	Disagree (4)	Strongly Disagree (5)
One organization should be responsible for standardized regulation of professional NFB throughout the United States					
As participant, I comfortable using QEEG to guide NFB treatment					
As participant, I comfortable using clinical assessment such as self-report and clinical interview					
As participant, I comfortable using standardized assessment tools such as CBCL, administered psychological evaluation.					
I have access to supervision and consultation with other NFB professionals.					
I have noticed significant decrease in clients' symptoms when Neurofeedback Training is combined with counseling, as compared to treating symptoms with counseling alone.					

Thank you for your participation in this survey!