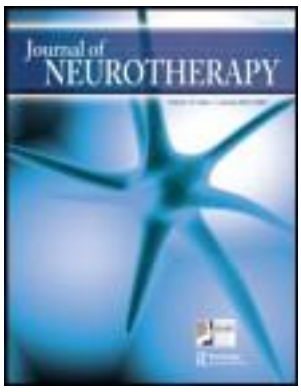

Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

Practitioner Perspectives of Neurofeedback Therapy for Mental Health and Physiological Disorders

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Published online: 25 Nov 2010.

To cite this article: Jonathon E. Larson EdD, MS, LCPC, CRC , Catherine B. Ryan & Mogens B. Baerentzen MS (2010) Practitioner Perspectives of Neurofeedback Therapy for Mental Health and Physiological Disorders, Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience, 14:4, 280-290, DOI: 10.1080/10874208.2010.523334

To link to this article: http://dx.doi.org/10.1080/10874208.2010.523334

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Journal of Neurotherapy, 14:280–290, 2010
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ISSN: 1087-4208 print/1530-017X online
DOI: 10.1080/10874208.2010.523334

Practitioner Perspectives of Neurofeedback Therapy for Mental Health and Physiological Disorders

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ABSTRACT. *Introduction.* This study utilized a systematic method to identify and to categorize practitioner perspectives related to neurofeedback therapy (NFT) for mental health and physiological disorders. We offer the identified themes for utilization in future research on practitioner variables influencing process and outcome variables, which adds to our knowledge and understanding of NFT.

Method. Seventy-one practitioners completed online surveys gathering demographic information and responses to open-ended questions about advantages, disadvantages, practitioner characteristics, and essential components of NFT. We utilized Loftland and Loftland's (1984) systematic filing system and Berg's (2004) themes to concepts to analyze our data set, which allowed us to combine similar themes into categorical frameworks.

Results. Our results provided five conceptual frameworks: advantages (84 concepts within 6 categories), disadvantages (53 concepts within 5 categories), knowledge (29 concepts in 4 categories), skills (35 concepts within 3 categories), and traits (36 concepts in 5 categories).

Conclusion. An extensive number of themes revolved around three major findings. The first finding reported the ongoing NFT effectiveness of improving health conditions through symptom reduction and enhancing quality of life. The second finding emphasized an extensive practitioner commitment to overcoming the complexity of NFT. The final major finding described dissemination and financial issues related to NFT. Within this study, we expand on these issues and discuss the implication for future research and practice. We do not offer the findings within this study as a comprehensive list; rather, we offer this as a potential starting point for expanding the research of variables related to NFT.

KEYWORDS. EEG feedback, mental health, neurofeedback, physiological, practitioners

INTRODUCTION

Research continues to provide empirical support for neurofeedback therapy (NFT) efficacy and effectiveness. A recent meta-analysis demonstrated large effect sizes for NFT on impulsivity and inattention and a medium effect size for hyperactivity symptoms of ADHD (Arns, de Ridder, Strehl, Breteler, & Coenen, 2009). Criteria levels for clinical efficacy were1 (*not empirically supported*), 2 (*possibly efficacious*), 3 (*probably efficacious*), 4 (*efficacious*), and 5 (*efficacious and specific*), with NFT reaching Level 5 for the treatment of ADHD. Hammond (2007) compiled an extensive

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bibliography of neurofeedback providing empirical evidence supporting NFT efficacy. Yucha and Montgomery (2008) published *Evidence-Based Practice in Biofeedback and Neurofeedback*, providing evidence related to NFT effectiveness for various mental health issues, such as, anxiety, depression, and psychosis. A current study of 70 individuals with paranoid schizophrenia reported positive outcomes with the utilization of NFT (Bolea, 2010). Kaiser (2010) reported 5,565 biofeedback and neurofeedback papers indexed within PubMed. As evidence of continued research growth, Arns (2010) summarized 31 applied neuroscience papers published between August and December of 2009. Despite advances in the quantity and quality of NFT research, a comprehensive literature review found only a handful of investigations into practitioner variables related to NFT process and outcome variables. Rubi (2006) investigated the utilization of NFT around the world and reported on practitioner demographic variables. Additional findings of our literature review included one article that emphasized the importance of establishing formal NFT practice standards (Hammond & Kirk, 2008) and another that discussed a staff training program that highlighted age as a potential practitioner variable for specific client types (Thompson & Thompson, 2008). Research reported the importance of exploring client and practitioner relationships (Aguilar & Lyle, 2010). Limited investigation into NFT practitioner variables triggered our team to explore this topic. Through qualitative methods, this NFT study identified practitioner perspectives, categorized themes, and organized variables. The goal and research significance focused on identifying a wide range of NFT themes for utilization in future research on practitioner variables influencing process and outcome variables, which adds to our knowledge and understanding of NFT. Our findings emphasized three reoccurring themes: NFT effectiveness, practitioner commitment to understanding NFT complexity, and dissemination and financial problems. Our five tables organize concepts related to NFT advantages, disadvantages, knowledge, skills, and traits.

We utilized previously established theoretical models to provide guidance in organizing this study. First, we utilized the stages of change theory (DiClemente & Prochaska, 1998) to organize our findings into advantages and disadvantages conceptual frameworks. The stage of change theory may be understood in terms of advantages and disadvantages for changes related to a stated topic or subject. We found the stages of change model as a simple and efficient method to organize perspectives related to pros and cons of NFT. Second, we utilized previous established therapeutic relationship models and working alliance scales to guide our findings of related client/practitioner variables (Barrett-Lennard, 1962; Gaston & Marmar, 1991; Horvath & Greenberg, 1987; McGuire-Snieckus, McCabe, Catty, Hansson, & Priebe, 2007). Crucial to our study, the empirically based relationship models offered the existence of therapeutic relationships among practitioners and clients; these models also guided the organization of client/practitioner relationship variables. Third, we utilized empirically based personality models to organize practitioner traits (Cattell & Mead, 2008; Goldberg, 1993). These personality models provided an effective and established method to categorize personality factors.

METHODS

Participants and Procedure

With Institutional Review Board approval, we recruited NFT practitioners by posting study announcements on NFT discussion boards. The announcement directed participants to an online survey that included a consent process; we collected responses from 71 practitioners. For each completed survey, we donated $2 to the International Society for Neurofeedback and Research. We utilized Loftland and Loftland's (1984) systematic filing system and Berg's (2004) themes to concepts for analyzing our data set, which allowed us to combine similar themes into categorical frameworks. This method consisted of carefully reviewing each

group of responses for each question and then identifying a category label that summarized the concepts. Initially, a research assistant entered demographic information into a SPSS data set for analyses. For the qualitative analyses, we utilized the following questions: What are the advantages and disadvantages of using NFT in your practice? What are the essential ingredients of NFT? What are the characteristics of effective NFT practitioners? Within a Microsoft Excel spreadsheet, we recorded all responses corresponding to each question to start organizing this data set. All disadvantage responses were recorded underneath a disadvantage header, advantage under an advantage header, ingredients under ingredients, and characteristics under characteristics. Independently, each researcher categorized all the themes into categories. The team met 10 times to organize this data set into concepts and frameworks; this involved extensive discussions about developing a systematic and user-friendly organization of this data set. We conducted this sorting process with the entire qualitative data set, and we eventually developed conceptual frameworks with category labels organizing all of the uncovered concepts. This process eventually led to 237 themes sorted into 23 categories within five conceptual frameworks. For example, the themes related to health improvements were sorted into the same column. Eventually this category was labeled Physical and Psychological Health Improvements. In this process, we discarded duplicate responses and merged closely related concepts until we had a manageable number of concepts. Per our qualitative methodology, two research assistants, not involved in the initial sorting process, were asked to sort the concepts into corresponding categories. We found a Kappa score of 0.94 between the two independent raters. They disagreed on 8 of the 237 items, and we decided to recategorize 6 of the 8 items.

Instrumentation

We utilized an online demographic survey for gender, age, education, licensures, certifications, length of doing NFT, and sessions per week. Participants also completed seven online open-ended questions. The questions utilized for this study included, What are the advantages and disadvantages of NFT? What are the essential ingredients of NFT? What are the characteristics of effective NFT practitioners?

RESULTS

Demographic information for 71 research participants demonstrated gender (50% male, 50% female), age ($M = 55.79$, $SD = 10.61$) with a range of 31 to 75, years practicing NFT ($M = 8.14$, $SD = 6.11$) with a range of .05 to 25; hours of NFT per week ($M = 19.74$, $SD = 14.55$) with a range of 2 to 56. We found 92.1% had a master's degree or higher, 50.7% had a doctoral degree, 5.6% had a doctorate of medicine, 14.1% certificate only, 21.1% license only, and 31.0% with both certificate and license. Our analyses examined survey responses to categorize similar concepts into conceptual frameworks. Our results provided five conceptual frameworks: advantages (84 concepts within six categories), disadvantages (53 concepts within five categories), skills (35 concepts within three categories), knowledge (29 concepts in four categories), and traits (36 concepts in five categories). The following sections provide results for the five conceptual frameworks.

Neurofeedback Advantages

Table 1 provides the Neurofeedback Advantages conceptual framework; each column represented a distinctive category label with concepts underneath the corresponding category. The advantages framework consisted of 84 concepts within six categories. We labeled the first category Physical and Psychological Health Improvements; this included concepts such as improved sleep, decreased hyperactivity, and decreased anxiety and depression. This category appeared to represent client outcome variables consistently reported in

TABLE 1. Neurofeedback advantages.

Physical and Psychological Health Improvements	Effectiveness	Alternative/ Addition to Traditional Therapy	Positive Client Feedback	Promotes Holistic Awareness of Self and Environment	Positive Feedback from NFT
Increased calming effect for participating in the therapeutic process	Accelerated pace of therapy	Acts as a stand-alone intervention	NFT gives client's the rewarding feeling to overcome problems	Teaches mind and body awareness	Treatment has empirical support
Improved sleep	Increased improvements that verbal therapy cannot produce	Complementary treatment for psychotherapy and biofeedback	Assists clients without dwelling on the problems	Identifies neurological benefits and helps client become aware of harmful contexts	Treatment is overrun with client referrals
Decreased hyperactivity	Quick, efficacious, and direct symptom reduction	Helpful when medications may be needed but are ineffective or have too many side effects	Changes and transforms lives	Provides self-awareness and self-reflection	Treatment allows interaction with clients
Decreased depression	Assist numerous people in a short period	Provides more options for treatment	High client satisfaction because of immense benefits	Provides awareness of self within the environment	The therapy is interesting for the practitioner
Increased concentration	85–90% client progress rates	Good for clients who don't want traditional talk therapy	Engages the client	Clients better understand the underlying issues within their brain rather than the *DSM* criteria	Therapists have seen improved revenues
Improved attention	Safe, effective, and enduring	May be better than medication for some clients	Close clinical interaction between therapist and client	Promotes a grasp of mind, brain, and body principles	Treatment stimulates learning
Decreased impulsivity	Long-term resolution	Provides an adjunct option to medication	Provides a client-centered treatment		Provides the feeling that one can finally make a

(*Continued*)

TABLE 1 (continued)

Physical and Psychological Health Improvements	Effectiveness	Alternative/ Addition to Traditional Therapy	Positive Client Feedback	Promotes Holistic Awareness of Self and Environment	Positive Feedback from NFT
					real difference in people's lives
Decreased anxiety	Addresses symptoms rather than diagnosis for long term solution	Innovative treatment			Practitioners can learn a lot from NFT
Improved speech	Works with all cultures, education, age levels	Provides neurological regulation that medication and psycho-therapy do not address			Treatment is client centered
Concentrated problem solving	Works for numerous domains, health, education, relationships, employment, and mental health	May be better than hypnosis because there is less of a possibility of secondary trauma			
Improved calmness of mind and body	Incorporates peak performance	Provides salient advantages over other mental health resources			
Increased general health	Direct impact of brain functioning	May be better than cognitive rehabilitation for brain injury symptoms			
Improved hearing	Best tool for regulation of affect and pain	May be integrated with traditional psycho-therapy			
Improved symptoms of Asperger's, autism, TBI,	Scientific	Provides a new way to regulate arousal			

(*Continued*)

TABLE 1 (continued)

Physical and Psychological Health Improvements	Effectiveness	Alternative/ Addition to Traditional Therapy	Positive Client Feedback	Promotes Holistic Awareness of Self and Environment	Positive Feedback from NFT
PTSD, ADHD/ADD, addiction, epilepsy, OCD					

Note. $n = 71$. NFT = neurofeedback therapy; *DSM* = *Diagnostic and Statistical Manual of Mental Disorders*; TBI = traumatic brain injury; PTSD = posttraumatic stress disorder; ADHD/ADD = attention deficit hyperactivity disorder/attention deficit disorder; OCD = obsessive–compulsive disorder.

published research. The second category of Effectiveness consisted of accelerated pace of therapy; quick, efficacious, and direct symptom reduction; 85 to 90% client progress rates; and works with all cultures, education, and age levels. These concepts offered additional variables to explore when conducting efficacious or effectiveness research. We found Alternative/Addition to Traditional Therapy as the third category, including concepts such as complementary treatment for psychotherapy and biofeedback, provides more options for treatment, provides an adjunct option to medication, and provides neurological regulation that medication and psychotherapy do not address. We offered these items as potential hypotheses that may assist in improving current or developing new NFB theories for research purposes. The fourth category of Positive Client Feedback included assists clients without dwelling on the problems, changes and transforms lives, engages the client, and provides a client-centered treatment. This category provided variables related to client perspectives about the NFB process. We labeled the fifth category Promotes Holistic Awareness of Self and Environment, including concepts of teaches mind and body awareness, identifies neurological benefits, and helps client become aware of harmful contexts. The sixth category labeled Positive Feedback from NFT included treatment has empirical support, treatment stimulates learning, and practitioners can learn a lot from NFT.

Neurofeedback Disadvantages

Table 2 describes the Neurofeedback Disadvantages conceptual framework; each column represented a distinctive category label with concepts underneath the corresponding category. This framework consisted of 53 concepts within five categories. The Expenses category provided a large number of concepts, such as equipment costs, fear that insurance companies will shut down, most insurance companies will not pay for NFT, and too expensive for most families. The time-consuming category described items such as major time requirement for learning the technical and brain knowledge, can be considered a boring procedure, and major time commitment for clients. Novelty of Discipline included lack of independent research, limited understanding of NFT by many physicians, and warring factions regarding theories and practice in the field. The Mixed Results category presented items such as does not work for 10 to 15% of clients; outcome is best using integrative practice, but there are no signs of this happening on a large scale; and not used on average problems—typically used for hard cases that do not respond to earlier interventions. The Not Well-Recognized Outside the Field category included confusion with other types of biofeedback, practitioners are frustrated with NFT being ignored, lack of public knowledge of NFT, and treatment is being ignored by medical field.

TABLE 2. Neurofeedback disadvantages.

Expenses	Time Consuming	Novelty of Discipline	Mixed Results	Not Well-Recognized Outside Field
Equipment costs	Can be considered a boring procedure	Lack of independent research	Can be slower than hypnosis in gaining response	People may think NFT is weird
Education costs	Major time requirement for learning the technical and brain knowledge	Limited understanding of NFT by many physicians	Does not work for 10–15% of clients	Confusion with other types of biofeedback
Huge initial financial setback for practitioners	Major time commitment for clients	Difficult to discuss medical reductions	Can be technical problems with software and hardware	Lack of recognition and therefore reimbursement
Ongoing expenses	Additional time to maintain equipment	People think it will cure everything and forge to look at other life factors: family, diet, sleep patterns, drugs, alcohol use	Outcome is best using integrative practice, but there are no signs of this happening on a large scale	Practitioners are frustrated with NFT being ignored
Fear that insurance companies will shut down	Additional time to write reports to pass audits	Psychiatrists do not know how medications affect brain wave functioning	Not used on average problems—typically used for hard cases that do not respond to earlier interventions	Lack of public knowledge of NFT
Most insurance companies will not pay for NFT	Additional time for billing and insurance coding	Warring factions regarding theories and practice in the field		Treatment is ignored by the medical field
Lack of insurance coverage		Wild claims by unlicensed providers		Difficult to explain the NFT process to clients, the public, funders, practitioners, and researchers not in the field
Out-of-pocket expenses		Too many unlicensed individuals providing NFT and making wild claims		May cause a snake oil syndrome for the public, medical, and other practitioners
Billing				Lack of the public domain knowledge

(*Continued*)

TABLE 2 (continued)

Expenses	Time Consuming	Novelty of Discipline	Mixed Results	Not Well-Recognized Outside Field
Lack of recognition in terms of reimbursement				Not well-known in other disciplines: psychology, social work, counseling, medicine, and psychiatry
Many clients have to self-pay				
Entrepreneurial element				
Expenses to keep up with the latest equipment				
Long-term expense ramp-up costs				
Too expensive for most families				
Limited billing codes				

Note. $n = 71$. NFT = neurofeedback therapy.

Neurofeedback Practitioner Characteristics—Knowledge

Table 3 provides the Practitioner Characteristics—Knowledge conceptual framework. This framework provided 29 concepts within four categories. The first category of Technology included concepts such as software, hardware, protocol, 10–20 system, QEEG, and EEG. The second category of Brain provided function, dynamics, anatomy, neuro-physiological, and psycho-physiological. The third category of Theoretical Frameworks described human change process, psychological, learning theory, operant conditioning, coherence, and connectivity. The final category of Related Interventions included psychotropic medications, nutrition, psychotherapy, and peripheral biofeedback.

TABLE 3. Neurofeedback practitioner characteristics—Knowledge.

Technology	Brain	Theoretical Frameworks	Related Interventions
Software	Function	Human change process	Medication
Hardware	Dynamics	Psychological	Psychotropic medication
Equipment	Process	Learning theory	Nutrition
Electronics	Anatomy	Operant conditioning	Psychotherapy
Protocol	Neurophysiology	Family systems	Physical therapy
10–20 system	Psycho-physiological	Human development	Occupational therapy
QEEG		Biological	Peripheral biofeedback
EEG		Coherence	
Live Z-score training		Connectivity	
Low-frequency training			
LENS			

LENS = low frequency neurofeedback system.

Neurofeedback Practitioner Characteristics—Skills

Table 4 describes the Practitioner Characteristics—Skills conceptual framework. This framework included 35 concepts within three categories. Interpersonal Skills category demonstrated attending and following; reflecting verbal and nonverbal cues; investigating; teaching; and building rapport. The Professional Skills category included reading published research and clinical guidelines, accessing consultation, utilizing supervision, and utilizing business models. The Technology Skills provided understanding EEG, understanding QEEG, utilizing equipment in proficient manner, utilizing time to practice, and connecting real time EEG to client state.

Neurofeedback Practitioner Characteristics—Traits

Table 5 shows the Practitioner Characteristics—Traits conceptual framework. This framework provided 36 concepts within five categories. We utilized Goldberg's (1993) review of the Big-Five personality factor structure and Cattell and Mead's (2008) description of the 16 personality factor questionnaire to organize and to label this conceptual framework. Their models organize personality traits into five categories. The first category of Introverted/Extroverted included sense of humor, enthusiasm, and affable. The second category of Low Anxiety/High Anxiety provided calm, trustful, patience, tolerance of ambiguity, optimism, and hope. The third category Receptive/Tough Minded described empathic, friendly, accepting, open-minded, and sensitive to differences. Accommodating/Independent, the fourth category, provided flexible, confidence, curious, and inquisitive. The final category of Unrestrained/Self-Controlled included know limits, integrity, mindful, and ethical.

DISCUSSION

This study explored practitioner perspectives of NFT. Our results provided 237

TABLE 4. NFT practitioner characteristics—Skills.

Interpersonal Skills	Professional Skills	Technology Skills
Attending, following, and reflecting verbal and nonverbal cues	Reading published research and clinical guidelines	Understanding EEG
Investigating	Accessing consultation	Understanding QEEG
Questioning through socratic method	Utilizing supervision	Utilizing equipment in proficient manner
Probing	Augmenting with other modalities	Maintaining low impedance
Observing behaviors	Maintaining learning time	Reducing artifact noise
Teaching	Networking with researchers and practitioners	Utilizing time to practice
Building rapport	Following ethical guidelines	Connecting real-time EEG to client state
Interacting directive	Utilizing business methods	
Interacting nondirective	Integrating knowledge and assessments	
Encouraging	Completing thorough assessments	
Engaging	Referring for additional treatments	
Coaching	Addressing psycho-physiological issues	
Focusing	Assessing symptoms	
Asking permission	Developing treatment plan	

TABLE 5. Neurofeedback practitioner characteristics—Traits.

Introverted/ Extraverted	Low Anxiety/High Anxiety	Receptive/ Tough-Minded	Accommodating/ Independent	Unrestrained/ Self-Contolled
Attentive[a]	Calm	Emphatic	Flexible	Know limits
Sense of humor	Trustful	Attentive[a]	Confidence	Integrity
Enthusiasm	Patience	Friendly	Curious	Mindful
Affable	Tolerance of ambiguity	Accepting	Analytical	Careful
Warm[a]	Willing to make mistakes	Warm[a]	Investigative	Reliable
	Optimism	Open-minded	Inquisitive	Ethical
	Hope	Sensitive to differences	Willing to pioneer	
		Creative	Availability	
		Realistic expectations		
		Observant		

[a]Falls into two categories.

themes sorted into 23 categories within five conceptual frameworks for future research on NFT process and outcome variables. The first essential finding included extensive themes related to NFT effectiveness of improving health conditions through symptom reduction and enhancing quality of life. Table 1 included 84 concepts related to NFT advantages, with symptom reduction and positive client outcomes being the most prevalent reported themes. We offer that these extensive NFT positive client results may partially explain practitioner willingness to undertake the financial risks, the complexity, and the time-consuming aspects associated with NFT. For future research, in addition to symptom reduction, we offer the importance of investigating the impact of NFT on quality of life goals related to relationships, careers, housing, financial stability, recreational endeavors, spiritual pursuits, and educational objectives. For practice implications, the advantage framework identified a list of positive outcomes that could be utilized when discussing NFT with potential clients and family members.

The second finding emphasized an extensive practitioner commitment to overcoming the complexity of NFT. Tables 3, 4, and 5 describe 100 distinct concepts related to practitioner knowledge, skills, and traits. We offer the existence of an extensive practitioner commitment to understand multiple theoretical frameworks, apply complex technology, display therapeutic traits, maintain professional expertise, utilize multifaceted interpersonal skills, explore new NFT applications, and risk financial investment. Future research may include exploring the influence of practitioner commitment on NFT outcomes and investigating methods to support commitment and reduce practitioner burnout connected to the high demands of NFT. For practice implications, these findings may suggest the importance of brief practitioner training sessions focusing on commitment and complexity issues related to NFT.

The final major finding described dissemination and financial issues related to NFT, with Table 2 presenting 53 concepts primarily revolving around these issues. We recommend additional research systematically investigating dissemination barriers, such as lack of public awareness, healthcare awareness, political issues, and insurance problems. At a practical level, potential solutions may include systematically integrating NFT with university training programs, connecting university students with NFT practitioners, identifying support for gathering pilot data and submitting grants, attending related conferences, participating in professional associations outside of

NFT, and publishing research within various disciplines. To understand the financial aspects, we offer the importance of completing financial analyses related to practitioner and client financial outcomes. Within practice, we offer exploring methods to reduce start-up costs for university students to promote the early adoption of NFT. Potential questions related to practitioner characteristics may include, How do we identify and measure practitioner knowledge, skills, and traits? Do practitioner factors influence outcomes? Are there crucial practitioner factors that influence outcomes? Future factor analysis research may include developing and testing a measurement tool for practitioner variables. Understanding the influence of practitioner variables may lead to improved outcomes, efficient NFT training sessions, and guidance in matching NFT technology with practitioner characteristics.

We do not offer these findings as a comprehensive list of NFT issues or practitioner factors; rather, we offer this as a potential starting point for investigating practitioner variables related to NFT. In addition, we may have missed additional themes due to our sample size and method of data collection. Overall, we attempted to provide a systematic method to identify practitioner perspectives to guide components of future NFT research.

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