BCIA NEUROFEEDBACK CERTIFICATION PROGRAM

Instructor: Cynthia Kerson, PhD
(26 BCIA F2F Hours | 10 Self-paced Hours Accredited Instruction)
Level: Introductory to Intermediate

Practice Gap:
Neurofeedback is an up and coming modality that utilizes operant conditioning to regulate brain state. It is a form of applied psychophysiology – a union of psychology and physiology. There are many research publications showing efficacy with ADHD, seizure disorders, substance abuse, autistic spectrum disorders, mild traumatic brain injury and post traumatic stress disorder, to name a few. A medical and/or psychological practitioner may, under the scope of his or his supervisor’s license, practice this intervention. It is essential that the practitioner gains full knowledge of the neuroanatomical and neurophysiological features of the brain sites being trained and understands the likely objective and subjective reactions. A medical professional would be brought to current knowledge about psychological implications and a psychologist would be brought to current understanding about physiological issues.

References:


Educational need:
Improved understanding of the psychological and physiological implications of brain wave biofeedback (neurofeedback), improved understanding of treatment protocol selection, improved understanding of the treatment setting and improved understanding of the outcomes desired.

**Abstract:** This 3-day F2F workshop, which is a 26-hour section of the full 36-hour BCIA didactic course for certification in neurofeedback, discusses the concepts of the origins, learning principles, best training protocols, and treatment plans for specific presentations for neurofeedback and neuromodulatory approaches. This course will also demonstrate EEG recording and training procedures with state of the art instrumentation and will prepare the clinician for providing neurofeedback in his practice.

9 objectives for this 3-day course:
1. The attendee will gain a foundational knowledge of the history, development and relevant research relating to the emergence of electroencephalography (EEG) and subsequent EEG operant conditioning.
2. When brain training, it is fundamental to understand the structure and behaviors of the brain at the cellular level. This course introduces the concepts of neurophysiology and neuroanatomy and how they are important to the psychologist in developing neurofeedback treatment plans.
3. The attendee will be oriented to the nature of operant conditioning and its applications with neurofeedback, neuromodulation, to provide a mechanism for which the psychologist can rely while training the client.
4. The instructor will provide practical training to facilitate an understanding of the equipment, electronic and instrumentation concepts so the actual EEG acquisition is without artifact and provides clean recording.
5. Demonstration and trainings with neurofeedback instrumentation will be provided in small group settings. This is to build confidence in the psychologist’s ability to manipulate the equipment and to provide safety guidelines for the psychologist while training the client.
6. Understanding how the brain interacts with medications and how these interactions affect EEG measure is vital. Many clients appear medicated and/or ascertain new prescriptions while undergoing neurofeedback training. The psychologist will understand these mechanisms better.
7. Because there are ethical issues specific to neuromodulation and brain training, the instructor will discuss them to better prepare the psychologist.
8. Because there are relevant clinical populations and non-candidates for neurofeedback training, the psychologist will be briefed on how to discern them. Additionally, the best protocols, based upon the QEEG and their presentation, will be discussed.
9. The attendee will be better prepared to sit for the BCIA certification exam to show competence in this area of treatment.

**COURSE OUTLINE**

*There is a 2-hour lab time (blueprint area VIII) required in addition to the times outlined below that will be completed during the lunch breaks and/or evenings. We will determine the time during the first day’s orientation.*
DAY 1 – 9 Hours

**INTRODUCTIONS**
8:00-8:30am (.5 hour)
Brief orientation and introductions from the instructor and attendees. Course overview, lab time and BCIA certification requirements.

**1A: OPERANT CONDITIONING IN NEUROFEEDBACK Part 1 of 2**
8:30-10:30 (2 hours)
(Obj 1, 3 and 9; BCIA Blueprint area I)
The instructor will provide a review of the discovery of surface electrical potentials from the brain first by Caton in animals and then by Berger in humans, opening the door to a relatively rapid development of the EEG field in basic science and medicine. Discuss how parallel development of behavioral conditioning methods by the work of Thorndike, Skinner, and Hull provided the foundation for operant conditioning of the EEG once technology had developed the necessary tools. Review the development of biofeedback training concepts and technical requirements.

**BREAK**
10:30-10:45 (.25 hour)

**1B: OPERANT CONDITIONING IN NEUROFEEDBACK Part 2 of 2**
10:45-12:45 (2 hours)
(Obj 1, 3 and 9); BCIA Blueprint area I
The instructor will continue with a discussion of learning theory, specifically classical and operant conditioning and how these learning models relate to neurofeedback training and shaping, including generalization, habituation and extinction. This section will conclude with discussion about basic, underlying physiological and cognitive stress models.

**LUNCH**
12:45-1:45 (1 hour)

**1C: NEUROMODULATORY APPROACHES**
1:45-3:45 (2 hours)
(Obj 1, 8 and 9); BCIA blueprint area IX
The field of neurotherapy is young and ever changing. This section includes discussion of current trends in neurotherapy including z-score and LORETA and combining with physiological modalities such as heart rate variability. It also provides a survey lecture of the most common, both historical and modern neurofeedback, entrainment and stimulation protocols available as well as their intended and expected results based upon the presentation and goals of the client.

**BREAK**
3:45-4:00 (.25 hour)

**1D: EEG CLIENT SESSION PREPARATION AND TRAINING PRACTICUM Focus/attention/SMR Training**
4:00-6:00 (2 hours)  
(Obj 3, 4, 5, 8 and 9); BCIA blueprint area VIII  
The instructor will demonstrate hooking up and preparing, coaching and finalizing a neurofeedback session with a volunteer from the group. Then the attendees will break into hands-on small-group neurofeedback training sessions. There will be a “clinician” and “client” and observers in each group. Each attendee will have an opportunity to role play and/or observe the actual process of hooking up and providing neurofeedback training along with any assessment interview to determine the best protocol.

GROUP BCIA REVIEW QUIZ COMPLETION  
6:00-6:30 (.5 hour)  
(Obj 9); BCIA blueprint area I (.5 hours)  
Q&A period and daily test review

DAY 2– 8.5 Hours

2A: BIOELECTRICAL CONCEPTS AND ELECTRONICS, IMPEDANCE AND ARTIFACTS: Part 1  
8:30-10:30 (2 hour)  
(Obj 4 and 9) BCIA blueprint area III  
This section will familiarize the attendee with the electronics and instrumentation used to facilitate neurofeedback. This will include Ohms’ law, EEG impedance measures, analog and digital recording, the 10-20 International System for site location and some impedance and artifact issues. Examples of EEG artifact will also be presented.

Review of the terminology associated with EEG instrumentation and data collection. Discuss referencing issues, including basic linked-ear reference and mathematically corrected common average Laplacian reference methods. Explain the basis for common-mode-rejection circuit in EEG amplifiers and resulting distortions of rhythmic EEG voltages at sites near earlobe reference electrodes. Show related distortion of topographic findings due to earlobe corruption from propagated dominant frequency activity.

BREAK  
10:30-10:45 (.25 hour)

2B: BIOELECTRICAL CONCEPTS AND ELECTRONICS, IMPEDANCE AND ARTIFACTS: Part 2  
10:45-11:45 (1 hour)  
(Obj 4 and 9) BCIA blueprint area III  
In this section, the instructor will present EEG records to instruct about the differences between magnitude, power, and logrhythmic FFT outcome values and their effects on the probability requirements of parametric statistical analyses. Describe FFT spectral analysis parameters affecting outcomes, including epoch duration, sampling rates and windowing methods. Demonstrate artifact removal methods. Stress the importance of competent (less than 10K) impedance levels for electrode placements, and the noise and signal-noise consequence of sloppy electrode attachment.

2C: NEUROIMAGING TOOLS  
11:45-12:45 (1 hour)  
(Obj 4, 8 and 9) BCIA blueprint area III
The EEG is one of many neuroimaging tools. The neurofeedback clinician should be aware of their use, what they measure, and how they compare to the EEG and its interpretation strategies. This section is a survey of the most common current imaging devices, what they do, how they compare to the EEG and what value they have to the neurofeedback clinician in augmenting assessments.

**LUNCH**
12:45-1:45 (1 hour)

**2D: VIDEO: Evidence-based Neurofeedback Clinical Applications** Barry Sterman, PhD
1:45-3:45 (2 hours)
(Obj 1, 2, 3, 8 and 9); BCIA blueprint area VII

This course will review the discovery and research evaluation of several EEG rhythms that are important to neurofeedback today. Their relevance to clinical applications becomes apparent through an understanding of the neurocircuitry involved. Disturbances of motor excitability, control, and regulation, as well as the cognitive and emotional deficits that can result will be a major focus. Of equal importance is the proper analysis of the EEG manifestations related to these disorders with quantitative measures, and the appropriate therapeutic application of operant conditioning principles based on the results obtained. Recent developments in our understanding of the way neurocircuitry is modified through experience will also be examined.

There will be a short discussion time at the end of the video.

**BREAK**
3:45-4:00 (.25 hour)

**2E: EEG CLIENT PREPARATION AND TRAINING DEMONSTRATION AND PRACTICUM Alpha Theta Training**
4:00-6:00 (2 hours)
(Obj 3, 4, 5, 8 and 9); BCIA blueprint area VII

Alpha theta training is a much more subjective experience than most other forms of neurofeedback. The instructor will discuss the historical events, the complaints for which it is indicated, abreaction, the concept of cross-over and necessary psychotherapeutic skills for this type of training. The instructor will then demonstrate a typical alpha theta neurofeedback hook-up and session showing how to provide the optimal experience for this type of training. Finally, the attendees will break into small groups and practice being the “client,” “clinician” and observe.

**GROUP BCIA REVIEW QUIZ COMPLETION**
6:00-6:30 (.5 hour)
(Obj 9); BCIA blueprint area I (.5 hours)

Q&A period and daily test review

**DAY 3– 8.5 Hours**

**3A: COMMON INTAKE/ASSESSMENT TOOLS**
8:30-10:30 (2 hours)
(Obj 8 and 9); BCIA blueprint area VI
Knowing what protocol to use, when to change protocol, when to stop treatment and how to assess is integral to successful treatment. This section looks at the assessment tools for neurofeedback and the appropriateness to their utility based upon the clinician’s credentials.

Review standard patient/subject office/lab procedures. Provide examples of relevant intake interview, stressing the need for person-to-person contact, ethical discussion of privacy and mutual obligations, and request for prior medical and behavioral reports as indicated, if not previously obtained.

Discussion, presentation and interpretation of QEEG and mini-EEG reports for discussion about protocols, which will include how best to present the findings to your client.

Review and explain treatment plan, including sites and systems implicated, software customization for treatment objectives, and outcome measurement techniques. Use these elements to provide the structure and objectives for producing an effective treatment plan.

If there is time, demonstration and practicum of IVA / TOVA and/or CNSVS.

**BREAK**
10:30-10:45 (.25 hour)

**3B: MINI ASSESSMENT DEMONSTRATION**
10:45-12:45 (2 hours)
(Obj 1, 7, 8 and 9); BCIA blueprint area III (2.5 hours)

Providing neurofeedback or other neuromodulatory approach necessitates an understanding of the individual client’s brain function. Without access to QEEG acquisition and/or interpretation, the clinician can perform a 2 or 4 channel assessment. This section of the course will demonstrate how this is done best. Additionally, reassessing during treatment is essential to be sure the treatment goals are being met.

**LUNCH**
12:45-1:45 (1 hour)

**3C: NEUROFEEDBACK PRACTICUM: Part 1**
1:45-3:45 (2 hours)
(Obj 3, 4, 5, 8 and 9); BCIA blueprint area VII

Attendees will break into small groups and practice as “client,” “clinician” and observer and will be able to practice any of the training styles demonstrated in the course.

**BREAK**
3:45-4:00 (.25 hour)

**3D: NEUROFEEDBACK PRACTICUM: Part 2**
4:00-6:00 (2 hours)
(Obj 3, 4, 5, 8 and 9); BCIA blueprint area VII

Attendees will break into small groups and practice as “client,” “clinician” and observer and will be able to practice any of the training styles demonstrated in the course.

**GROUP BCIA REVIEW QUIZ COMPLETION**
6:00-6:30 (.5 hour)
(Obj 9) BCIA blueprint area VII
The group will complete the BCIA review quiz together and review concepts discussed during the 3 days.

**BCIA APPLICANTS - PLEASE NOTE:**

Complete BCIA coursework includes

- Completion of this 3-day course (26 hours), including the additional 2 hour lab time*
- Viewing the following 10 hours of .PPT or video presentations and responding to the review questions prior to the first day of the F2F section of the course:
  - 4-hour .PPT *Neuroanatomy and Physiology* by Cynthia Kerson (Obj 2 and 9; BCIA blueprint area II),
  - 2-hour .PPT on Research and Efficacy by Cynthia Kerson (Obj 1, 8 and 9; BCIA blueprint area IV)
  - 2-hour *Medication Prediction*.PPT by Jay Gunkelman (Obj 6 and 9; BCIA blueprint area V),
  - 2-hour *Ethics for Biofeedback*.PPT by Cynthia Kerson (Obj 7 and 9: BCIA blueprint area X).
- At the end of each day of the F2F section, time will be devoted to respond to the review quiz in group format that covers BCIA blueprint areas I, III, VI, VII, VIII and IX.

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