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**Biofeedback Certificate Program**

**48-Hour Program**

Instructors: Chris Gilbert, PhD, BCB, Cynthia Kerson, PhD, QEEGD, BCN, BCB

& Rich Sherman, PhD, BCB

**Abstract:** Biofeedback is an up and coming modality that utilizes operant conditioning to regulate physiological state. It is a form of applied psychophysiology – a union of psychology and physiology. There are many research publications showing efficacy with stress reduction, AD/HD, PTSD, anxiety, substance abuse to name a few. A medical and/or psychological practitioner may, under the scope of his license, practice this intervention. It is essential that the practitioner gains full knowledge of the anatomical and physiological features of the body systems 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 the organic issues.

This 48-hour course includes 18 hours of remote self-paced preliminary learning and 30 hours of F2F didactic and practical learning for certification in biofeedback. The instructors discuss the concepts of the origins, learning principles, best training protocols, and treatment plans for specific presentations for biofeedback and adjunct approaches. This course will demonstrate biofeedback recording and training procedures with state of the art instrumentation and will prepare the clinician for providing biofeedback in his practice

**Resources and Recommended Reading:**

Andreassi, J. (2000). *Psychophysiology: Human behavior & Psychological Response*. Erlbaum Assoc.

 New Jersey.

Basmajian, J. (ed). (1989). *Biofeedback: Principles and practice for clinicians* 3rd Ed. Williams &

 Wilkins.

Davis, M., Robbins Eshelman, E. & Mckay, M. (1995). *The relaxation & stress reduction workbook*.

 4th Ed. New Harbinger Publications, Inc.

Everly, G.S. & Lating, F.J. (2002). *A Clinical Guide to the Treatment of the Human Stress Response* 2nd

 Ed. Plenum, NY.

Hanna, T. (1988). *Somatics: reawakening the mind’s control of movement flexibility and health*.

 Perseus Books, MA.

Khazan, I. (2013). *The Clinical Handbook of Biofeedback.* Wiley-Blackwell, Sussex, UK.

Lehrer, P. & Wollfolk, RL. (eds.). (1993). *Principles and practice of stress management*: 2nd Ed.

 Guilford Press, NY.

Peper, E., Tylova, H., Gibney, K., Harvey, R. & Combatalade, D. (2008). *Biofeedback mastery: An*

 *experiential teaching and self-training manual.* AAPB, Wheat Ridge, CO.

Seaward, BL. (2002). *Managing stress: principles and strategies for health and wellbeing*. 3rd Ed.

 Jones and Bartlet Publishers, Boston.

Sapolsky, R. 2000). W*hy zebras don’t get ulcers: An updated guide to stress, stress-related diseases*

 *and coping*. Barnes and Noble Books, NYC.

Schwartz, M. & Andeasik, F. (2003). *Biofeedback: A practitioner’s guide*. 3rd Ed. Guilford Press, NY

Sherlin, L., Arns, M., Lubar, J., Heinrich, H., Kerson, C., Strehl, U., Sterman, M. B.

(2011). Neurofeedback and basic learning theory: Implications for research and the clinic. *J. Neurotherapy*:15(4). 292-304.

Sherman, R.A. (2011). *Pain:* *Assessment and Intervention from a Psychophysiological Perspective*

 AAPB, Wheat Ridge, CO.

Swami Rama, Ballentine, R & Hymes, A. (1998). *Science of breath: A practical guide*. Himalayan

 Institute Press. Honesdale, PA

Objectives:

1. The attendee will gain a foundational knowledge of the history, development and relevant research relating to the emergence of biofeedback and subsequent biofeedback operant conditioning.
2. When providing biofeedback, it is fundamental to understand the structure and behaviors of the body’s systems at the functional level. This course introduces the concepts of biological physiology and neuroanatomy and how they are important to the psychologist in developing biofeedback treatment plans.
3. The attendee will be oriented to the nature of operant conditioning and its applications with biofeedback, and 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 physiological acquisition is without artifact and provides clean recording.
5. Demonstration and trainings with biofeedback 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 body interacts with medications and how these interactions affect physiological measure is vital. Many clients appear medicated and/or ascertain new prescriptions while undergoing biofeedback training. The psychologist will understand these mechanisms better.
7. Because there are ethical issues specific to biomodulation and brain training, the instructor will discuss them to better prepare the psychologist.
8. Because there are relevant clinical populations and non-candidates for biofeedback training, the psychologist will be briefed on how to discern them. Additionally, the best protocols, based upon the assessment and the client’s 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.

**Pre-F2F Remote Self-paced Learning (18 hours)**

(All reading materials are in your DropBox folders)

1. *Introduction to Biofeedback: Its History and Learning Concepts | Cynthia Kerson*

3 hours | BCIA blueprint areas I.A, I.B, I.C & I.D

This section takes a look at the beginnings of psychological measure, from the first measurements of animal and then human electrophysiological systems. It leads you to current paradigms through the concepts of cybernetics, operant conditioning and self-regulation. It will also look at the development of the institutional bodies.

* 1. View 1-hour BFB Intro at <http://youtu.be/WnTkymaFrNk>
	2. View: BFB Timeline.jpeg
	3. Read:
		1. Articles from <http://psychclassics.yorku.ca/index.htm>
		2. There are no documents in your folder
	4. Complete “Review Questions A" and send to cynthia@brainsinternational.com
1. *Stress, Coping and Illness | Chris Gilbert*

4 hours | BCIA blueprint area II

This section summarizes relationships between variables of stress (biochemical, physiological, emotional) and health disturbances. The stress concept emphasizes current understanding of "allostatic load" (attempts to maintain homeostasis) in various systems, for both acute and chronic stress. Coping methods are seen as personal resources and techniques to reduce the overload aspects of stress. We will cover stress assessment and psychoneuroimmunology, including beneficial effects of relaxation techniques facilitated by biofeedback training.

* 1. View
		1. Biopsychosocial Model.pptx
		2. Negative Affect.pptx
		3. Stress Response and Assessment
	2. Read documents in Documents Folder
	3. Complete “Review Questions B” and return to cgilbert2@gmail.com
1. *Evidence-Based Research Methods in Applied Psychophysiology | Chris Gilbert*

1 hour | BCIA blueprint area I.E

This section describes levels of research on biofeedback mechanisms and outcomes, from simple case studies to randomized controlled trials. The value for most will be in knowing better how to evaluate research claims and read published research with more knowledge of the terms and methods. The summary of biofeedback research sponsored by AAPB (clinical efficacy document) will be discussed with illustrations of certain relevant topics such as sham biofeedback

* 1. View Pre C Slide Presentation.ppt
	2. Read documents in Documents Folder
	3. Complete “Review Questions C” and return to cgilbert2@gmail.com
1. *Concepts of Applied Learning | Cynthia Kerson*

1 hour| BCIA blueprint area V.B

This section discusses how emotion, motivation and resistance to learning as well as client/clinician relations affect training. It will also discuss concepts that are related to how a person should learn based upon physiological responses to the training, including tonic and phasic activity, habituation, orienting, transferring learning en vivo, fractionating and response stereotypy.

1. View 38-minute ConceptsAppliedLearning.pptx (you do not need the password to view this PPT)
2. Read documents in Documents Folder
3. Complete “ Review Questions D” and return to cynthia@brainsinternational.com
4. *Structure and Function of the Autonomic Nervous System | Chris Gilbert*

1.5 hours | BCIA blueprint area V.A & V.B

This section sketches the important aspects of the autonomic nervous system, clarifying the reciprocal nature of the sympathetic and parasympathetic divisions with reference to functional utility for maintenance and survival. Basic psychophysiological concepts such as orienting vs. defense response, habituation, response stereotypy, and specificity of responses will be explained. Differentiation of emotions by specific autonomic changes (fear vs. anger, for example) will be covered, and we will focus on the potential for biofeedback training whenever relevant.

1. View Pre E PPT.ppt parts 1 and 2
2. Read:
	* 1. Autonomic nervous system – scholarpedia.mht
		2. Read documents in Documents Folder
3. Complete “Review Questions E” and return to cgilbert2@gmail.com
4. *Muscle Anatomy and Physiology: Antagonistic and Synergistic Muscle Groups | Chris Gilbert*

1 hour | BCIA Blueprint area IV.A

This section covers differences among muscle types (striated, smooth, cardiac); structure and function  from sarcomere to motor unit to whole muscle; slow vs. fast twitch muscle differences; action potential, stretch reflex, alpha and gamma motor neurons; muscle coordination and synergy.

* 1. View: Muscle Anat. and Physiology.pptx
	2. Read documents in Documents Folder
	3. Complete “Review Questions F” and return to cgilbert2@gmail.com
1. *Basic Neuroanatomy and Physiology for EEG Training | Cynthia Kerson*

1 hour | BCIA blueprint areas VI.A VI.B & VI.C

A discussion about the 10 20 system and their underlying functions as well as a discussion about the cortical lobes and their anatomical and physiological aspects will be had. The instructor will also discuss the neuronal activities presumed when affecting the EEG.

* 1. View 1 1/2 –hour NeuroA&P Bio Course.pptx (this is longer than required for BCIA, but necessary for learning)
		1. When prompted in the slide set, view: <http://www.youtube.com/watch?feature=player_detailpage&v=eZundDVPIYw>
		2. <http://www.youtube.com/watch?v=yy994HpFudc>
	2. There are no documents in the folder
1. Complete “Review Questions G” and return to cynthia@brainsinternational.com
2. *Electronic Concepts Relevant to Psychophysiological Recording | Cynthia Kerson*

.5 hour | BCIA blueprint area III.D

Ohms law, impedance, amplifiers, bandpass, telemetry and artifacts are important concepts for the applied psychophysiologist. To perform optimally, the clinician needs to understand these guidelines and their recording practices meet them. Without this basic knowledge, the adage, “garbage in – garbage out” will likely apply and the training will be ineffective.

* 1. View 20-minute Electricity Bio Course at <https://www.youtube.com/watch?v=Fz82VY7RYxk&list=UU6VpWiH9qXEpbwmn-9vaN0g>
	2. There are no documents for this section
	3. Complete “Review Questions H” and return to cynthia@brainsinternational.com
1. *Effects of Medications on Biofeedback Modalities*

1 hour | BCIA blueprint area V.A

It is very important to know what, when and how much medications your clients are ingesting as these effect all psychophysiological measures and need careful consideration. Discussion of effects on ANS as well as CNS.

* 1. View 12-minute Psychopharmacology for ANS and CNS at <https://www.youtube.com/watch?v=tSe4aL-Qa6k>
	2. Read documents in Documents Folder
	3. Read: <http://www.townsendletter.com/FebMarch2013/whattodo0213.html>
	4. Complete “Review Questions I” and return to cynthia@brainsinternational.com
1. *Professional Conduct | Rich Sherman*

4 hours | BCIA blueprint area VIII

The Ethical Principles of Biofeedback (EPOB or Principles) consist of a set of guidelines agreed to by the BCIA, which outline the moral duty, obligation, or custom on how certificants should behave professionally. They should not be viewed as limiting the scope of ethical responsibility of BCIA certificants. Rather, the EPOB point out and underscore particular areas in which there is concern. These Principles will be discussed.

* 1. View presentations approx. 2 hours 1to3 in folder
	2. Read documents in Documents Folder
	3. Complete “Review Questions J” and return to cynthia@brainsinternational.com

**4-Day F2F (30 hours)**

***Day 1: Cynthia Kerson | 7.5 hours***

*Introductions*

8:30 – 9:00

A short introduction from your instructor as well as all attendees.

1. *Measurable Observations*

9:00 – 11:00 | 2 hours | BCIA blueprint area VII.A

The attendee will become familiar with intake and retest protocols to create optimal treatment plans as well as the psychophysiological stress profiles and continuous performance tests that are those most widely used to measure response to stressful situations.

*Break | 11:00 – 11:15 | .25 hrs*

1. *General Applications of Biofeedback Part 1*

11:15-12:45 | 1.5 hours | BCIA blueprint area V.C

This section of the course will discuss using biofeedback to assess various response systems systematically using a standard "stress profile," and how to interpret results to the client; and using biofeedback to accompany therapeutic exploration, revealing somatic and autonomic responses to personal stressors.

*Lunch 12:45 – 1:45 | 1 hour*

1. *General Applications of Biofeedback Part 2*

1:45-3:45 | 2 hours | BCIA blueprint area V.C

Facilitating various forms of relaxation and stress recovery training with biofeedback; desensitization, use of thresholds, multiple modality monitoring. Teaching and sharpening client self-regulation skills with Autogenics, progressive muscle relaxation, and breathing regulation.

*Break 3:45 – 3:30 | .25 hours*

1. *Temperature and Electrodermal Training*

1:45 – 3:45 | 2 hours | BCIA blueprint area III

Temperature training has historically been used to aid in treatment for headaches, Reynaud’s and relaxation.

Anxiety is a disorder that focuses on worry about the future and rumination about the past. This section will discuss how EDR biofeedback, aided with relaxation breathing training will aid in bringing one to the present and reduce the anxious/over-aroused response to stressors.

This section will focus on the history and practical aspects of both modalities and will include hands-on practice of temperature training in a group setting.

***Day 2: | Chris Gilbert | 7.5 hours***

*Introductions*

8:30 – 9:00

A short introduction from your instructor as well as all attendees.

1. *Heart Rate Variability Training*

9:00-11:00 | 2 hours | BCIA blueprint area III

This major biofeedback variable involving synchrony between cardiac and respiratory systems will be explained, demonstrated, and practiced. The output of various HRV systems, from cell phone apps to 24-hour hospital monitoring, can be interpreted at different levels of precision, but all have value for improving health. We will cover the use of breathing pacers, pulse feedback only, and pulse plus breathing plus other variables. Time–based and frequency-based analysis will be explained, as well as how to determine resonant frequency for individual clients.

Break 11:00-11:15 | .25 hours

1. *Capnometry and Relaxation Breath Work*

11:15 – 12:45 | 1.5 hours | BCIA blueprint III

Breathing regulation is very accessible, and fundamental to other psychophysiological modalities. This section will focus on theoretical and practical aspects of breathing training, including capnometry, or the measure of CO2 in exhaled air. Demonstration of CO2 monitoring will show its value as a check on normal blood chemistry and presence of hyperventilation.

*Lunch 12:45 – 1:45 | 1 hour*

1. *Relaxation Methods and Psychotherapeutic Techniques*

1:45 – 3:30 | 1.75 hours | BCIA blueprint areas VII.B and VII.C

Several relaxation methods will covered, including progressive muscle relaxation, Autogenics, guided imagery, and meditation. We will touch on the basics of hypnosis, including how to recognize inadvertent hypnotic trance states occurring, the overlap with guided imagery, and precautions about relaxation-induced anxiety. We will also cover some principles of psychotherapy, including empathy and rapport, the importance of non-verbal behavior, and maximizing the power of placebo response.

*Break 3:30 - 3:45 | .25 hours*

1. *Chronic Muscle Pain*

3:45 - 5:45 | 2 hours | BCIA blueprint area IV.C

This section covers the modulation of mainly muscle pain: ascending and descending inhibitory pathways including relevant brain structures such as the PAG, RVM, involvement of frontal lobes and cingulate cortex; Melzack & Wall's gate control theory, neuromatrix theory, trigger points, CNS sensitization, and differences in people with chronic muscle pain.

***Day 3 | Chris Gilbert | 7.5 hours***

1. *EMG Training Considerations*

8:30 – 10:00 | 2.5 hours | BCIA blueprint area III.B (.5 hrs), IV.D (2 hrs)

Review of pre-course materials on muscle basics; static and dynamic SEMG assessment for various conditions. Down-training and up-training strategies; brief coverage of incontinence, pelvic muscle disorders, and phantom limb pain. Brief overview of research in EMG; including a demonstration of progressive relaxation.

*Break 10:00 – 10:15 | .25 hours*

1. *sEMG Electrode Placement Demonstration*

10:15 – 12:15 | 1.5 hours | BCIA blueprint area IV.E

Choosing muscles and electrode placements for tension-type headaches, TMJ disorders, neck and back pain, patello-femoral pain syndrome, postural correction, and worksite ergonomic  applications.

*Lunch 12:15 –1:15 | 1 hour*

1. *sEMG Practicum 1*

1:15 – 3:15 | 2 hours | BCIA blueprint area III

Practical training based upon demonstrations; muscle training methods such as discrimination, faded biofeedback, left-right equilibration training.

*Break 3:15- 3:30 | .25 hours*

1. sEMG Practicum 2

3:30 – 5:30 | 1.5 hours | BCIA blueprint area IV

Practical training based upon demonstrations: EMG estimation, motor copy training (movement template), improving body mechanics, improving breathing, hip and neck flexion as measures of guarding.

***Day 4 | Cynthia Kerson | 7.5 hours***

1. *ANS and CNS Modalities to Treat Pathophysiological Disorders*

8:30 – 9:30 | 1 hour | BCIA blueprint area V.D

Migraine, Raynaud’s, hypertension, cardiac arrhythmias and hyperventilation syndrome are among the most common disorders treated by biofeedback. The section provides the best treatment plans based upon evidence-based research for each of them along with some others.

1. *Adjunct Procedures with Biofeedback Part 1*

9:30 – 11:15 | 1.75 | BCIA blueprint areas VII.B, VII.D, VII.E and VII.F

Changes in cognitions, schemas, secondary gains, expectations, mid-treatment effects and family dynamics are some of the valuable markers for success or nonsuccess that the clinician should observe. Additionally, cognitive, nutritional and exercise retraining are excellent for restructuring negative behaviors that are easily added to the therapeutic program. This section will explore those that best contribute to clinical success based upon relevant research.

*Break 11:15 – 11:30 | .25 hour*

1. *Adjunct Procedures with Biofeedback Part 2*

11:30 – 1:15 | 1.75 | BCIA blueprint areas VII.B, VII.D, VII.E and VII.F

Changes in cognitions, schemas, secondary gains, expectations, mid-treatment effects and family dynamics are some of the valuable markers for success or nonsuccess that the clinician should observe. Additionally, cognitive, nutritional and exercise retraining are excellent for restructuring negative behaviors that are easily added to the therapeutic program. This section will explore those that best contribute to clinical success based upon relevant research.

*Lunch 1:15 – 2:15 | 1 hour*

1. *Neurofeedback, Brain Wave Biofeedback, Brain Computer Interface . . .*

2:15 – 3:15 | 1 hours | BCIA blueprint area VI.C and VI.D

After a brief review of the self-paced module on neuroanatomy and physiology, the instructor will discuss clinical uses of the EEG and provide a examples of neuromodulatory modalities for specific indications such as epilepsy, AD/HD, anxiety, depression, TBI, substance abuse and others. She will then demonstrate how to find 10 20 sites and a neurofeedback session.

*Break 3:15 – 3:30 | .25 hours*

1. *Neurofeedback Practicum*

3:30 – 5:30 | 2 hour | BCIA blueprint areas III.A and VI.D

The attendees will work in groups to locate 10 20 sites and practice hooking up to get a good recording.