BIOFEEDBACK

You learn to control your own body

Measurement

Audio-visual display

Biofeedback device

Biofeedback newsletter
The term “biofeedback” was coined in the late 1960’s.

Described laboratory procedures being used to train experimental research subjects to alter brain activity, blood pressure, heart rate, and other bodily functions that normally are not controlled voluntarily.

Today researchers see biofeedback as a training tool more so than a treatment technique.
DEFINITION OF BIOFEEDBACK

- Biofeedback is a treatment technique in which people are trained to improve their health by using signals from their own bodies.
- Physical Therapists use biofeedback to help stroke victims regain movement in paralyzed muscles.
- Psychologists use it to help tense and anxious patients learn to relax.
MODELS USED IN THE BIOFEEDBACK

❖ Physiological changes result in symptom changes
❖ Cognitive changes
❖ Placebo/nonspecific effects
❖ Feed forward processes
❖ Bandura’s self-efficacy
❖ The patient education model
❖ The R. Rosenthal interpersonal expectancy model
❖ The Omer and London model
INSTRUMENTAL CONDITIONING OF AUTONOMIC NERVOUS SYSTEM RESPONSES

- Biofeedback as a learning theory.
- Principles of operant learning: schedules of reinforcement, shaping, discrimination, generalization, extinction, & habituation.
- The role of mental processes in learning.
As a form of applied psychophysiology, clinical biofeedback helps individuals change their behaviors with feedback from their physiology.
The roots of behavioral therapy involve the notion that one learns maladaptive behaviors and thus, one can unlearns them.

Behavioral therapy applies the principles of operant and respondent conditioning, as well as cognitive learning to change behaviors.

Behavioral medicine focuses on applications of learning theories to medical disorders and other health related topics.
Stress Research & Relaxation Therapies

- Fight or Flight response
- Selye’s physiological stress response: alarm, resistance & exhaustion.
- Progressive muscle relaxation training
- Guided Imagery
- Autogenic training
WHY BIOFEEDBACK?

❖ The bio behavioral therapies, including biofeedback, are used
❖ as adjuncts to pharmacological treatments,
❖ as part of lifestyle change, or
❖ as a stand-alone therapy.
APPLICATION OF BIOFEEDBACK

❖ Phobic & Anxiety
❖ Tension Headache Disorders
❖ Chronic Pain
❖ Mood Disorder
❖ Chronic Fatigue
❖ Insomnia Syndrome
❖ Migraine
❖ Temporo mandibular
❖ Muscle Tension
❖ Urinary Incontinence
What biofeedback instruments are supposed to do?

- To monitor a physiological process.
- To measure what is monitored.
- To present what is monitored or measured as meaningful information.
SKIN TEMPERATURE

- A correlate of peripheral vasoconstriction.
- An indirect measure of sympathetic outflow.
EMG (ELECTROMYOGRAPHY)

- Measures muscle activity by detaching electrical activity occurring with certain muscles.
- An electrical correlate of muscle contraction.
SKIN CONDUCTANCE

- A correlate of sweat gland activity.
- Galvanic skin response (GSR)
- Electro dermal activity (EDA): electro dermal level (EDL), electro dermal response (EDR)
- Skin conductance activity (SCA): skin conductance level (SCL), skin conductance response (SCR)
- An indirect measure of sympathetic outflow.
**Heart Rate**

- Measured in beats per minute, typically by a heart rate sensor that monitors the light level transmitted through the vascular tissue of the fingertip and the variations in light intensities corresponding to variations in blood volume.

**Respiration**

- Measured in breaths per minute, typically by a strain gauge worn around the chest or the abdomen.
BIOFEEDBACK MODALITIES FOR TREATMENT OF HYPERTENSION

- Thermal biofeedback
- Direct BP biofeedback
- EMG-frontalis biofeedback
- Electro dermal feedback
- Respiratory sinus arrhythmia (RSA)
Thermal Biofeedback

Skin Temperature Gauges show changes in the amount of heat given off by the skin, a measurement that indicates any change in blood flow.

Thermal Biofeedback—Hand Warming

The main goal of hand-warming is to assist in measuring our level of stress through skin temperature, and thereby allow us to change our stress level to meet the circumstances.
THERMAL BIOFEEDBACK

- The goal in temperature training is to turn off the SNS
- Work best when the training lasts for about 15 minutes
- Accompany autogenic training and/or imagery
- Goal of hand warming: > = 90 °F
- Maximum vasodilation: 96 °F
✓ The EMG measures the amount of electrical discharge in the muscle fibers and therefore it quantifies muscle contraction and relaxation. This electrical discharge is translated into auditory and visual displays and the person can begin to notice and bring about changes in muscle tension which he/she was previously unable to do.
**EMG-FRONTALIS BIOFEEDBACK**

- EMG and Biofeedback: The electro myograph (sEMG) allows readings to be taken via 3 surface sensors placed on the skin over appropriate muscles.
EMG TRAINING FOR STRESS MANAGEMENT

❖ Frontal EMG training for stress management: train to reduce muscle activity for general muscle relaxation.

ELECTRO-DERMAL FEEDBACK
GSR in Biofeedback: The galvanic skin response (GSR) feedback instrument measures skin conductivity from the fingers and/or palms. The GSR is highly sensitive to emotions in some people.

Galvanic Skin Response Sensors (GSRs) use the amount of sweat you produce under stress to measure the conductivity of your skin. They are often used to reduce anxiety.
THANK YOU