Chapter 23: Biofeedback

Important	Extras
A. What is biofeedback? • Technique in which an electomechanical device monitors the status or changes of a person's physiological processes • ie; heart rate, muscle tension • allows person to gain **voluntary control** over bodily processes • an example of **operant conditioning** • depends on **reinforcement** to achieve desired results	-Responses that often control bodily processes, cannot be explained in biofeedback
B. Instrumentation and Measurement • **Level** of physiological functioning can be reflected by : i. Pitches of tone from an audio speaker ii. Degrees of loudness of a tone iii. Degrees of brightness iv. High or low numbers on a gauge	
• For some physiological processes the biofeedback techniques follow i. BP biofeedback=feedback on person's blood pressure(BP) measured with **sphygmomanometer** ii. HR biofeedback= measures and gives feedback on heart rate(HR) → heartbeats/ minute iii. GSR biofeedback = galvanic skin response or **electro dermal activity** (GDA) measures sweat gland activity on how readily skin conducts minute levels of electricity. iv. EEG biofeedback = electroencephalograph assesses electrical activity in brain such as brain waves v. EMG biofeedback = electromyography measures muscle tension by assessing electrical activity in muscles on contraction vi. Thermal biofeedback = skin temperature in region of body measure the flow of blood	-Sweaty skin produce more GSR then dry skin -Foot or hand
• All measures are **indirect** taken on the outside of body to reflect changes deeper in body or to **infer** internal changes	-Greater blood flow = greater temperature of body
• Biofeedback procedures begin after person has had time to adapt to situation	
• Limitations i. Physiological equipment creates **arousal** ii. Factors **prior** to procedure	-Running or walking before procedure

C. Training and Development Level
- Training incorporates a shaping procedure in which desired physiological changes act as **reinforcers** that get larger and larger as training progresses
- **Children** have **greater** success with biofeedback treatments
    i. More **enthusiastic** about equipment
    ii. Adults more **skeptical** about ability to control physiological functions

D. Certification in Biofeeback
- The Biofeedback Certification Institute of American **(BCIA)**
- **Non-university** based training programs

Biofeedback Applications

A. Treating Hypertension
- Biofeedback successful
    i. with or without relaxation techniques
    ii. sphygmomanometer
    iii. thermal biofeedback
    iv. GSR biofeedback
    v. EMG biofeedback
- Training = **3 months** of supervised training and asked to perform at **times of day** when their blood **pressure tends to be high**

-Medical condition of having blood pressure that is high over several weeks or more
-Medical procedures usually start with making lifestyle changes
-Drugs successful to an extent but produce side effects such as increased blood sugar levels

B. Treating Seizure Disorders: EPILEPSY
- Neurological condition
- Sudden seizures from **electrical disturbances** in the brain
- Patterns of **excessive neuron** firing in **temporal lobes** located above ears
- Grand mal
    i. Extreme **or tonic-clonic** seizure
    ii. Loss of consciousness
    iii. Muscle spasms

-Not easily reduced by medication
-Costly

• Treatment i. EEG biofeedback to **decrease harmful** brain-wave activity and **increase helpful brain wave activity** in other areas of brain ii. Medical professions systematically **choose which patients** might benefit from this treatment because of cost factor E. Treating CHRONIC HEADACHE • Two biofeedback approaches headache i. Tension-type • **Central nervous system dysfunction** and persistent contraction of **head and neck** muscles • **EMG** biofeedback ii. Migraine headache • Combination of **dilation of blood vessels** around brain and **dysfunction** of nervous system • **Thermal biofeedback**, monitoring hand to help them control **constriction and dilation of arteries** F. Treating ANXIETY • Two biofeedback approaches applied to reduce anxiety i. **EMG** biofeedback to relax muscles which reduce anxiety and **reduce tension in frontalis** region of head **ii. EEG** biofeedback **increases the person's alpha waves**, but evidence of its effectiveness **not strong** G. Treating ASTHMA • Two biofeedback approaches to reduce frequency and intensity of asthma episodes i. **EMG** biofeedback • **Reduce tension in frontalis** region ii. Respiratory biofeedback • Airflow is measured with apparatus as patient breathes and feedback is given on respiratory function so patient learns	-Children show just as much as success w. treatment as adults

to control airway diameter
- **Greater resistance identified in breath = poorer airflow**
- **Paired** with **relaxation** technique is a useful supplement to reduce asthma

H. Treating NEUROMUSCULAR DISORDERS

- Affect the **muscles and nerves** that carry information directing the muscles to move
- Paralysis = **spinal cord injury** or stroke that damages the brain
    - Causes muscles to become r**igid** and have **spasms**
- EMG biofeedback detects tiny changes in muscular function in specific body parts such as legs
    i. Patients with **incomplete** paralysis(**not total**) = **nerves** damaged
        - EMG shows muscle is tensed and so the patient is **encouraged** to **tense** it more and more until the muscle is totally **strengthened.**
    ii. Patients with **rigid** muscles = focus on **relaxing** muscles through achieving the EMG pattern of a **normal muscle action**