PSU BIOE EEG Group 2

Overview
Biofeedback is a training technique that has been proven to help those with ADHD learn to control their mind state. Collaborating with EEG 1, we have developed a biofeedback system utilizing an electroencephalogram (EEG) to monitor the brain state. Our team’s focuses were electrode placement and cap design. By using known methods and testing, we arranged the electrodes appropriately in an elastic cap, ready for interface.

Objectives
Focusing on electrode placement and cap design, we tested different electrode arrangements to find the minimum number of electrodes needed while still obtaining an accurate signal. We designed the cap to fit tightly but comfortably on the subject’s head. The wires were color-coded and shielded for ease of use.

Approach
- Defined the problem and the target customer
- Gathered costumer needs through literature search
- Reviewed the existing products and
- Visited a clinical EEG lab for a professional opinion
- Based our electrode placement of the accepted 10/20 system
- Created SolidWorks models of our proposed cap design
- Compared different fabrics and electrode types against customer needs
- Tested different electrode positions to target beta and theta waves
- Fabricated a prototype of the cap using the chosen material, electrode type, and electrode arrangement

Outcomes
- A unique cap was designed to target the brain waves associated with ADHD biofeedback training
- The design minimizes the number of electrodes to a total of 8, while giving the appropriate parameters for biofeedback
- Design is made of a tight polyester/spandex cap which fits comfortably on most adult-sized heads
- Total cost of the design is projected to be less than $100