

# Abstract

**Project Title: We Got the Beat**

**Project ID: 66**

I received an Itouch Smartwatch this past Christmas. When I returned to school from break I realized many other classmates had received smartwatches, Fitbits, and other fitness trackers. I read that 40 million Americans have a Smartwatch or fitness tracker! I believe consumers would want to know if they were accurate, compared to other methods of measuring pulse. If they are not accurate in measuring pulse, do they have any real value to the health goals of a person? The purpose of this project was to answer my big question: **What is the most accurate way to monitor heart rate?** My hypothesis was that manually measuring the radial pulse would be the most accurate method of monitoring heart rate.

I determined that my experiment would test manual radial pulse, a Fitbit, and my Itouch Smartwatch. These methods were my manipulated variables. Ultrasound doppler would be the control to which I would compare the accuracy of my variables. My controlled variables were: test participants had each method tested on their left radial artery for 15 seconds, and participants were females ages 30 to 50 years old. My experiment tested 10 participants for three trials. I then calculated the percent that each method differed or varied from the Doppler pulse. The percentage that each method varied from the Doppler pulse is my responding variable. The data supported my hypothesis that manually measuring the radial pulse was the most accurate method of monitoring heart rate. The manual pulse only varied from the Doppler pulse by 2.1%. The iTouch varied by 6.7%, and the Fitbit by a huge 11.7%! The lower the percentage, the closer the method is to accuracy. The manual pulse was the most accurate method of monitoring the radial pulse.

I accept my hypothesis that manual pulse is the most accurate method of monitoring heart rate. I discovered that Smartwatches and Fitbits use photoplethysmography (PPG) to measure heart rate. PPG is often inaccurate due to sweat, loosely fitted watch bands, or movement. I will continue to wear my Smartwatch, but to accurately monitor my heart rate, I will check my pulse manually.