



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

Name(s) Annie N. Zell	Project Number J1328
Project Title Dilation Sensation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to find out if it is possible to determine how exercised an individual is by measuring how dilated their pupils are.</p> <p>Methods/Materials My experiment involved taking pictures of my participant#s eyes using a digital camera. Each time I took a photo, I measured the light going into the eye using a device called a light meter. I then downloaded the pictures on a computer, zoomed in, and measured the pupil and the iris to make a dilation ratio. First, I took pictures of my participants when they were calm at different light levels. This would be used to compare my exercise data. Next I took photos of my teammates# eyes after each quarter during a basketball game. I also had my participants do running on an elliptical machine for 21 minutes and stopped them to take photos of their eye every 7 minutes. I not only took pictures of human participants, but I also used a dog participant. The way I had my dog exercise was by throwing the ball for her 60 times, pausing every 20 throws throughout the run to take a photo.</p> <p>Results The human and dog calm pupil dilation baselines were very similar which means their pupils have about the same reaction to light. My basketball teammates# pupil average dilated 45.4% above the calm baseline before the game and close to the end it reached 56.7%. The elliptical machine exercise resulted in an increase of 46.6% above the calm baseline after 21 minutes. My dog#s pupils were dilated 19.6% above the baseline even before her exercise started and near the end of her exercise they were 60% above the baseline.</p> <p>Conclusions/Discussion After all my experimenting was done I compared my exercise data to my calm baseline to figure out how much exercise effects the dilation of the pupils. What I found in my data is that the dilation of the pupil increases as exercise increases, but I was not able to prove my hypothesis that it was possible to tell how hard an individual has exercised by measuring the size of their pupils. I conclude that the different levels of excitement and anticipation during and before exercise affect the size of pupils as well. I think this science fair project could go much further than it already has and its method could be used to identify over-exercised or stressed individuals that are at risk of asthma attacks, heart failure, or aggression.</p>	
Summary Statement This project explores how different amounts of exercise affects the dilation of eye pupils.	
Help Received parents helped me collect the data, plot the data, edit my project backboard; borrowed a light meter; interviewed two ophthalmologists and a high school biology teacher	