



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Molly K. Vorwerck	Project Number J0342
Project Title Do the Eyes Have It? Do Your Pupils Reveal Your Real Feelings? The Effect of Emotional Stimuli on Pupil Size	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Does pupil size change when a person looks at visual stimuli with positive, negative, or neutral emotional content, compared to control stimuli? Which type of stimulus - positive, negative or neutral - will produce the biggest change in pupil size? Which type of stimulus will produce larger pupils (dilation) and which will produce smaller pupils (constriction)?</p> <p>Methods/Materials In a lighting controlled test area, seven subjects (4 females, 3 males) were shown 6 randomly ordered test (variable) pictures, 2 each with positive, negative or neutral emotional content. Each test picture was preceded by a matching control picture, a nonsense pattern equal in luminance to its test picture. An introductory non-test landscape picture was also shown first to counteract the "first picture effect". For each of the 12 control and test pictures, a digital photo of the subject's pupils was taken after 3 seconds and a back-up photo after 8 seconds. Subjects viewed each picture for 10 seconds. Pupil photos were calibrated and printed so that the print size equalled actual size. Pupils were measured and size changes between the control picture and the test picture were calculated (control size minus test size).</p> <p>Results Emotionally positive pictures caused the biggest pupil changes, an average of 14.75% larger (dilation). The negative pictures produced pupil dilation for females, 8.25%, but pupil constriction for males, -5.45%. The neutral pictures produced very small (2.9%) pupil size increases.</p> <p>Conclusions/Discussion Knowing that a person's private emotional response to something can be judged merely by looking at their pupils could be useful in lots of areas. Advertisers could tell whether people like their products, researchers could test infants' responses before they can talk, psychiatrists could use pupil information in treating mentally ill patients, and politicians could determine their real popularity, to name a few examples. Although some research on pupil size was done in the 1960's, very little has been conducted recently. It was surprising that emotionally negative stimuli produced opposite responses in males and females. More research on gender differences, as well as to sounds or smells (good/bad) or mental work (easy/hard) would be particularly interesting and informative.</p>	
Summary Statement Independent of physical response to light, a person's pupils dilate when shown emotionally positive stimuli, constrict (males) or dilate (females) when shown emotionally negative stimuli and dilate slightly when shown neutral stimuli.	
Help Received My mother loaned me her digital camera and showed me how to use it, and helped me calculate how to adjust the print size in Photoshop so that the print size equalled the actual pupil size. She also drove me to the university library for research.	