



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

<b>Name(s)</b> Nicholas F. Eisenhauer	<b>Project Number</b> <b>J0308</b>
<b>Project Title</b> <b>A Study Investigating the Effects of Forest Sounds vs. City Sounds on Stress in Human Subjects</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study was to examine how city sounds and forest sounds may affect stress in subjects as measured by fluctuations in clinical measurements and salivary cortisol levels.</p> <p><b>Methods/Materials</b> This was a randomized trial involving 9 human subjects, 5 adults ages 40-55 years and 4 children ages 8-18 years. After obtaining written consent, subject's baseline measurements of heart rate, blood pressure and respiration rate were taken and saliva was collected for cortisol measurement. Subjects were then seated in a quiet room with noise-reducing headphones through which they listened to either forest or city sounds for 10 minutes. Immediately after the listening session, the same measurements as at baseline were obtained and saliva collected. At visit 2, the subjects were exposed to the alternate sound and measurements/collections were taken in the same manner as at visit 1.</p> <p><b>Results</b> After listening to forest sounds, subjects showed a significant decrease in heart rate, blood pressure and respiration rate, while salivary cortisol measurements were inconclusive. City sounds affected no significant change in any of the parameters measured.</p> <p><b>Conclusions/Discussion</b> A paired T-test (using Infostat) confirmed a significant decrease in clinical measurements in nearly all subjects after listening to forest sounds. These same measurements were not significantly affected by exposure to city sounds. The cortisol values were inconclusive and a paired T-test showed no significant change for any cortisol values before or after listening to either city or forest sounds. Closer examination of the data revealed that non-commuters had lower baseline cortisol levels and that these levels did not change significantly after exposure to city sounds. One explanation is that non-commuters (children) did not find the city sounds, which were largely traffic noise, a trigger for stress. On the other hand, regular commuters' baseline values were double that of non-commuters and their cortisol values did go up an amount that might have been significant if we had examined a larger study population of commuters only.</p>	
<b>Summary Statement</b> My project explored the effects of forest sounds vs. city sounds on human stress levels.	
<b>Help Received</b> My mother's lab helped with the cortisol assay once I had collected the saliva samples. Also, my mom showed me how to compare 2 data points using Infostat.	