



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> <b>Sophia J. Eno</b>	<b>Project Number</b> <b>J1308</b>
<b>Project Title</b> <b>The Influence of Sound on Brainwaves and Mood</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> With this experiment, I was aiming to gather information on how sounds could affect brainwaves. Previous studies have shown a correlation between brainwaves and mood. My goal was to determine if certain sounds could alter brainwaves, and, therefore, alter a person's mood. For example, could a certain song reduce stress? Is there a sound that could help someone fall asleep? These were the questions I was thinking about when I designed my experiment.</p> <p><b>Methods/Materials</b> I used a Muse Monitor headset to collect my data. Muse is a headset the subject wears across the front and sides of their head, and is equipped with multiple sensors to accurately collect the subject's brainwaves. I also used a laptop to play sounds and an iOS app for data collection. My test took place in dark room with no stimulus besides the sounds being played. For each of the ten participants, the test started with thirty seconds of silence to allow their brainwaves to normalize; then six sounds were played for forty-five seconds each. The sounds were (in order): noise from a busy street, white noise, classical music, pink noise, sounds from nature, and pop music. There were thirty seconds of silence in between each sound to allow brainwaves to return to normal. The test took 7 minutes and 30 seconds in total (for each participant).</p> <p><b>Results</b> Of the six sounds I played, I found that four reduced Beta waves. The two sounds that reduced Beta waves the most were pop music (lowered the Beta waves by 12.0%) and classical music (lowered by 6.7%). The two that raised Beta waves were white noise and street sounds. White noise raised it the most (raised by 13.6%), but street sounds also raised it by a large amount (12.8%).</p> <p><b>Conclusions/Discussion</b> I concluded that sounds do have an impact on Beta waves. If my experiment, and the research showing that brainwaves correspond to mood is accurate, certain sounds could help reduce stress. Four of the sounds caused a drop in Beta waves. High levels of Beta correspond to stress, so having sounds that lower Beta waves could reduce stress.</p>	
<b>Summary Statement</b> I measured changes in brainwaves when subjects listened to sounds, finding that certain sounds can alter the levels of brainwaves.	
<b>Help Received</b> I designed and performed my experiment and analyzed the data myself.	