



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jack R. Suchodolski</b>	<b>Project Number</b> <b>S0420</b>
<b>Project Title</b> <b>The Effect of Time and Musical Experience on Vocal Pitch Matching</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment was to determine if musical experience and time had any impact on people's abilities to correctly match a pitch with their voice.</p> <p><b>Methods/Materials</b> Twenty-five people with 1+ years of musical experience and 25 people with no musical experience participated. Each participant received a video that gave a total of 7 different notes they had to vocally match. For each new note the participant heard, they had to wait an extra 10 seconds before singing it. By the last note, the participants were waiting up to a full minute before being allowed to reproduce the note they heard. Participants recorded themselves on a smart device, and sent in the recordings to be tuned using an electronic chromatic tuner.</p> <p><b>Results</b> Musically experienced people started with a median range of only 7 hz off from the original pitch and ended with a range of 31 hz. People without musical experience started with a median range of 32.5 hz and ended with a range of 105 hz. This showed that musically experienced people were able to reproduce pitches that were much more in tune than the people with no musical experience. Everyone's pitch gradually continued to worsen as the time duration, in between hearing a note and singing it, increased.</p> <p><b>Conclusions/Discussion</b> From looking at the collected data, the original hypothesis was confirmed; musically experienced people would be more in tune overall, but everyone's pitch would worsen as time durations increased. This is most likely because musically experienced people have been naturally trained in processing the pitch of notes and matching pitches they hear. And, just like any activity that involves the brain, the more it is repeated, the better neural pathways required for that activity function. One of the natural processes of the brain is to filter out unnecessary information, so the pitch of notes will generally be filtered out over time and the job of remembering that note becomes harder. This explains why everyone's pitch worsened as time durations increased.</p>	
<b>Summary Statement</b> My project tested how people with, and without, musical experience were able to vocally reproduce a pitch they heard over different time durations.	
<b>Help Received</b> I designed the entire experiment and gathered all the data. My honors integrated-science teacher at Redwood High School reviewed my experimental design at the beginning of the project.	