



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Anika J. Wille</b>	<b>Project Number</b> <b>S0422</b>
<b>Project Title</b> <b>Is Seeing Perceiving? Do Visual Cues Enhance Auditory Attention and Comprehension in a Mixed Speech Background?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study is to test if visual cues such as images will improve the comprehension of information when two sentences are spoken at once.</p> <p><b>Methods/Materials</b> To test my hypotheses, I conducted 2 sets of hearing tests, each consisting of a video recording of 2 spoken sentences combined with an image. Test #1 contains 2 sentences (sentences 1 and 2) that are dissimilar in words and sentence structure. Test #2 contains 2 different sentences (sentences 3 and 4) that are similar in their properties. Among the 28 male and 32 female subjects I recruited, I randomly divided them into 3 test groups, namely groups A, B, and C. Group A was shown images that were relevant to sentences 1 and 3. The images preceded the recorded sentences in the video, made using iMovie; while group B was shown images that were relevant to sentences 2 and 4. Group C was shown blank images that preceded the same recordings as used for groups A and B. In other words, all 3 groups were subjected to the same voice recordings, but to different visual cues prior to the mixed conversations.</p> <p><b>Results</b></p> <ol style="list-style-type: none"><li>1). In general, the performance between the multiple-choice test and written test is comparable.</li><li>2). In mixed sentences 1 and 2, the image of a dancer shown to group B significantly improved the understanding of sentence 2. The visual cue of a brown fox also improved the understanding of sentence 1 for subjects in group A, although to a lesser extent. The reason for this difference is unclear, possibly due to the dominant effect of dancer image and the content of sentence 2 on my subjects.</li><li>3). In hearing test #2, both visual cues (A: tiger; B: zebra) helped the understanding of sentences 3 and 4.</li><li>4). The hearing score of group C did not favor either sentence in both hearing tests. Group C scored lowest overall, due to the fact that they did not have any visual cues helping them.</li></ol> <p>My data suggest that visual cues help enhance the understanding and processing in a mixed speech background, particularly when sentences share similar sentence structure.</p> <ol style="list-style-type: none"><li>5). There is no overall gender difference in the auditory comprehension performance.</li></ol> <p><b>Conclusions/Discussion</b> Visual cues improve auditory attention and perception in a mixed speech background under most circumstances, particularly when the competing sentences are very similar. There is no overall gender difference in auditory perception of mixed sentences.</p>	
<b>Summary Statement</b> When subjects are presented with a visual cue of an image relating to one of two sentences being played at the same time, the sentence corresponding with the visual was comprehended more clearly over the other.	
<b>Help Received</b> My mentor offered advice on presenting my experiment more clearly, as well as possible ideas for further studies. My parents gave me advice on conducting statistical analyses (t-test).	