



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Hear It, Say It, Spell It: Investigating Nonvisual Pathways in Spelling	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals About 20% of the English speaking population has a spelling disability. This study was conducted to determine if auditory and verbal pathways in the brain could be used to learn how to spell, instead of the visual pathway usually emphasized in school.</p> <p>Methods/Materials Adults were given a classifying test of 29 frequently misspelled words, followed by a pretest of 20 pseudowords (pretest 1). Subjects then studied these words by listening to the spellings repeated 3 times /day for 4 days. A post-test was given on the 5th day. The process was repeated with a second set of words (pretest 2), but the subjects were asked to listen to and repeat the spelling aloud. All tests and instructions were carried out via email using sound files. The subjects were never allowed to see the spelling of the pseudowords.</p> <p>Results Box plots with 95% confidence intervals (CI) were used to evaluate learning. The median score for pretest 1 was 5% (CI=0, 8.75) vs. 80% for post-test 1 (CI=8.75, 95), indicating a 75% improvement using the auditory study method. The median score for pretest 2 was 10% (CI= 0, 15) vs. 70% for posttest 2 (95% CI = 65, 93.75), indicating 60% improvement using the auditory and verbal study method. Two-tailed paired t tests showed that the difference between the medians for each set of pretests and post-tests was statistically significant ($p < 0.0001$).</p> <p>Conclusions/Discussion Both methods were successful, but those who scored poorly on the classifying test seemed to benefit most by combining two pathways. It is possible that those who are chronically bad spellers have an under developed section of the brain that processes spelling visually, or that visual connections to the "spelling center" were not developed. It may be possible to improve spelling ability by bypassing the visual connection and making connections to the "spelling center" using alternative sensory pathways or multiple sensory pathways. Better understanding of this could lead to the development of alternative methods for teaching spelling that bypass the visual pathway.</p>	
Summary Statement Can spelling ability be improved by using nonvisual sensory pathways?	
Help Received Mother taught me the necessary statistics and helped find subjects.	