



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Stephanie A. Williams	Project Number S0326
Project Title The Eyes Have It, Phase II: Visual Perception in Children with and without Dyslexia	
Abstract Objectives/Goals The purpose of this experiment is to determine whether or not children with dyslexia are able to read with more accuracy letters, numbers, and phrases when the positive and negative space is reversed (a black background and white letters). Methods/Materials I created a test consisting of letters, numbers and words that are typically very difficult for dyslexic students to read, as well as two optical illusions. All of these images were represented twice: once normally (a white background with black letters) and once reversed (a black background with white letters). I then obtained informed consents from 86 subjects: 43 dyslexic children and 43 non-dyslexic children all between the ages of nine and eleven. I tested each child individually in a quiet, familiar room. I showed each child every image, asked them to either tell me what they saw or read the letter or phrase to me. I then recorded their answers on the testing sheets. I repeated this procedure for all dyslexic and non-dyslexic children. Results I found that there was no significant difference between the dyslexic and non-dyslexic responses to the letter questions. Furthermore, there was no significant difference between the dyslexic responses to the letters presented on a black background or a white background. However, there was a significant difference in the dyslexic children's responses to the phrases presented on the black and white background. In every phrase more dyslexic children read the phrase correctly when it was presented on the black background than when the same phrase was presented on the white background. I did a Chi-Square test to determine the statistical significance of these results. Using this test I found that the letters and illusions do not have significant results, however, every phrase had significant results. Conclusions/Discussion From this data I can conclude that it makes no difference for a dyslexic student to read single letters presented normally or on a reversed background. However, when those letters are formed in to words, and those words in to phrases there is a significant difference. Therefore, it is advantageous for dyslexic children to read phrases presented on a black background with white letters.	
Summary Statement To determine if children with dyslexia are able to read with more accuracy letters and phrases presented on a black background with white letters.	
Help Received Mr. Steely showed me how to perform the Chi-square test using Excel and my mother helped me edit my reports.	