CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
J0601

Project Title
Do You See What I See?

Abstract

Objectives/Goals
My objective was to determine whether changing the symbols used on an eye chart would affect the vision testing results.

Methods/Materials
I used 4 different Snellen Eye charts and tested the vision of 80+ participants in different age groups. My tests compared the vision acuity across two different eye charts in three cycles. I carried out the tests using 3 controls keeping the lighting, testing distance and chart height constant within each cycle. I recorded visual acuity and age.

Results
In cycle 1, most participants had higher visual acuity with the Tumbling-E chart as compared to a language chart (English or Hebrew). In Cycle 2, participants, occasionally, had a higher visual acuity with the Symbol chart, but on average the results for both charts were the same. In Cycle 3, pre-school kids ages 4 and 5 were tested on the Symbol chart and the English chart. Most pre-schoolers had the same visual acuity on both the charts, the difference being that the English chart was easier to read than the Symbol chart.

Conclusions/Discussion
After analysis of Cycle 1 results, I realized that there was an additional variable, namely, the different number of unique letters/symbols on each chart. The English/ Hebrew charts have 9 letters, but the Tumbling E chart has 4 symbols. Comparison of the results from Cycle 1 with Cycle 2 showed that as the number of symbols on the Symbol chart (12), came closer to the number of letters on the language charts (9), the difference in visual acuity reduced. Based on this, my conclusion was that changing the symbols used on an eye chart would not affect the vision testing results.
Next, in Cycle 3, I tried to determine whether #Familiarity# with symbols is another variable by testing pre-schoolers, who I considered less accomplished readers. I observed that they were often unable to explain what they saw on the Symbols chart, but were familiar with the English alphabet. I would like to do further work to devise a method to test 'Familiarity'.
This experiment confirmed that the DMV can use a symbols-based eye-chart for vision testing without any significant difference in results, instead of the current language chart. This would help to overcome the limitations associated with the ability to read any particular language.

Summary Statement
My project confirms that changing the symbols used on an eye chart will not affect the vision testing results, thereby assisting the DMV in replacing their current language eye-charts with symbol charts for eye-testing.

Help Received
My teacher Ms. Ligeti guided and encouraged me throughout my project. My Dad helped with creating the graphs. My Mom and my little brother for always being there for me.