

Greater San Diego Science and Engineering Fair 2015 PROJECT SUMMARY

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Project Title: Nature Vs. Nurture: Why do I have glasses?

Abstract

Objectives/Goals: The number of people using visual aids is increasing—and fast! However, it is still not completely clear what is causing this. This epidemiological study uses a sample of the population to find out the probabilities of inheriting need for visual aids based upon family visual history. Environmental factors such as TV viewing time and computer usage time will also be examined.

Hypothesis: If one parent of a child has glasses, visual acuity requiring the child to need glasses will be 25%. If both parents have glasses, visual acuity requiring the child to need glasses will be 40%. If neither parent has glasses, the chance of the child needing glasses will be 6%.

Methods/Materials: For this project, the main material was 400+ forms asking about visual history, family visual history, and environmental factors. Only 59 pieces of data were collected from optometrists as many optometrists refused to provide any data, or were not able to contribute much data. Optometrists that did help were two different Lens Crafters and the Mira Mesa Optometry. 364 pieces of data were collected from places such as Trader Joe's (39), a cultural function (77), swim meets (68), and school (180).

Results: The probabilities of inheriting a need for visual aids turned out to be much higher than expected. It was determined that the chance of a child needing glasses when both parents used them was 56.7%. The chance of needing glasses when only one parent wore glasses was 30.2%. When neither parent needed glasses, it was discovered that there was still a 19% chance of developing a need for glasses. These results were also compared to the opinions of three optometrists of San Diego. One optometrist thought that 50% of her patients acquired glasses from genetics. The other two optometrists thought that genetics was a much higher factor of poor eyesight and that 75% of their customers had poor eyesight caused by genetics.

Conclusions/Discussion: For years, children have been urged not to watch too much TV or spend an excessive amount of time on the computer. However, from the data collected, it was found that genetics resulted in a higher amount of children requiring glasses than environmental factors causing this need. Environmental factors merely increase the chances by a little. In fact, TV viewing time was discovered to have little, to no affect. The chances of getting glasses, when both parents had them, were above 50%.

Summary Statement: Genetics is a major factor of poor eyesight, much bigger than environmental factors. The percentages discovered by this project can help people be aware of their chances of getting glasses. They will be able to take precautions early and avoid eye problems that would have developed if their poor eyesight hadn't been caught early.

Help Received: When I was not available, many optometrists kept the forms on their desks and diligently passed them out to each customer. Specifically, I would like to thank Dr. Shapiro from the Lens Crafter at UTC Mall, Dr. Nishi Mehidratta and Hannah from Lens Crafter Carmel Valley, Dr. Huang from Sharp Rees-Stealy, and Dr. Guiang from Mira Mesa Optometry. They constantly supplied a generous amount of filled forms and were always ready to give advice. I would also like to thank Dr. Byron Newman and Dr. Satya Verma for frequently passing on ideas and suggestions to help move this project along.