

# Nature and Nurture of Nearsightedness

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## Introduction

The global prevalence of myopia, commonly known as nearsightedness, has grown significantly over the past decades. Many professionals are referring to this rise as a “myopia epidemic” considering that the rate of myopia is projected to rise from 28% of the world in 2010 to nearly 50% in 2050 according to the World Health Organization. While past theories pointed to more near work as the cause of this shift, newer research is investigating the role of sunlight and outdoor time in reducing the progression of nearsightedness, especially during childhood. With these factors in mind, reasons are being searched for regarding the overall increase of myopia and why certain groups of people are more likely to be myopic than others.

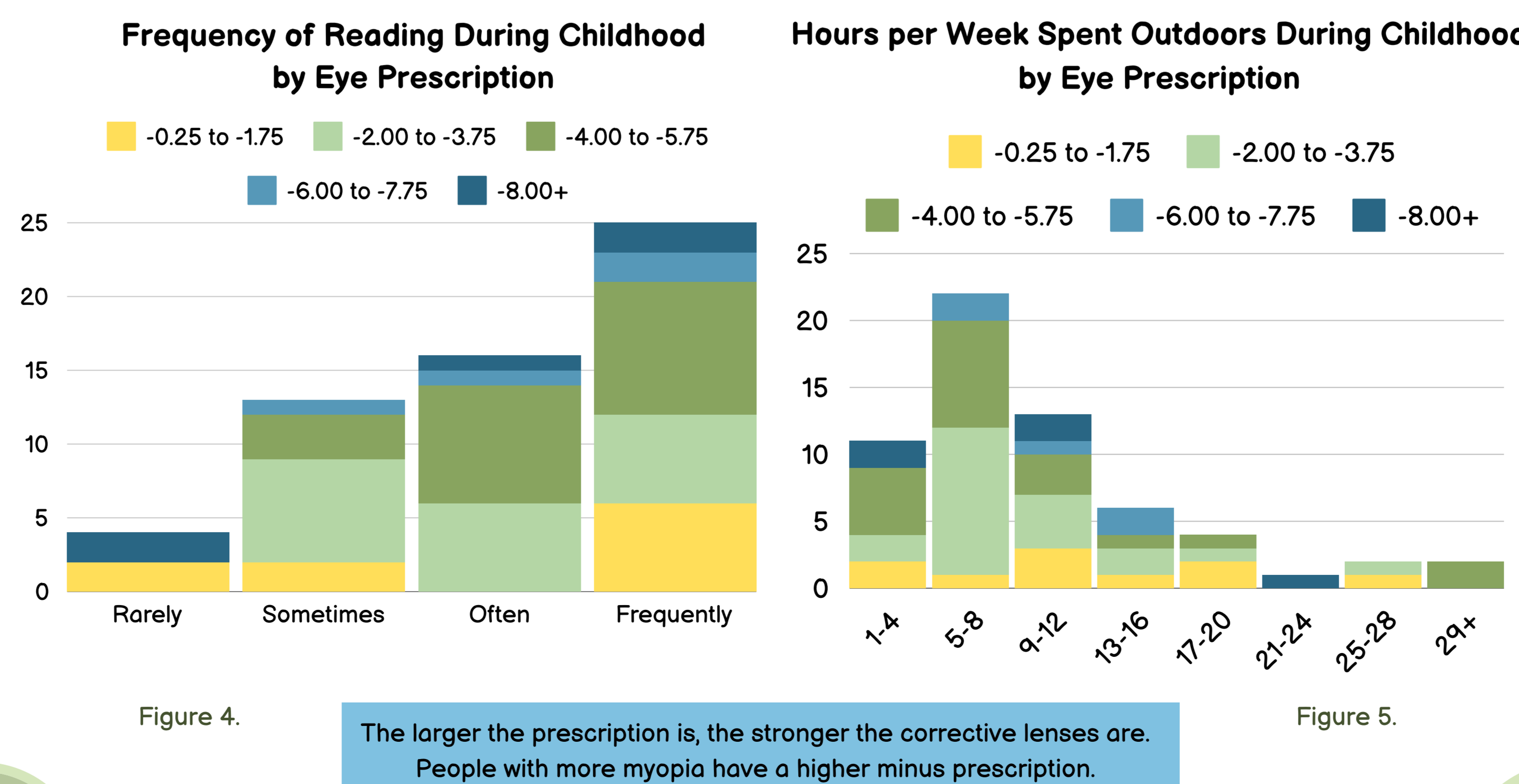
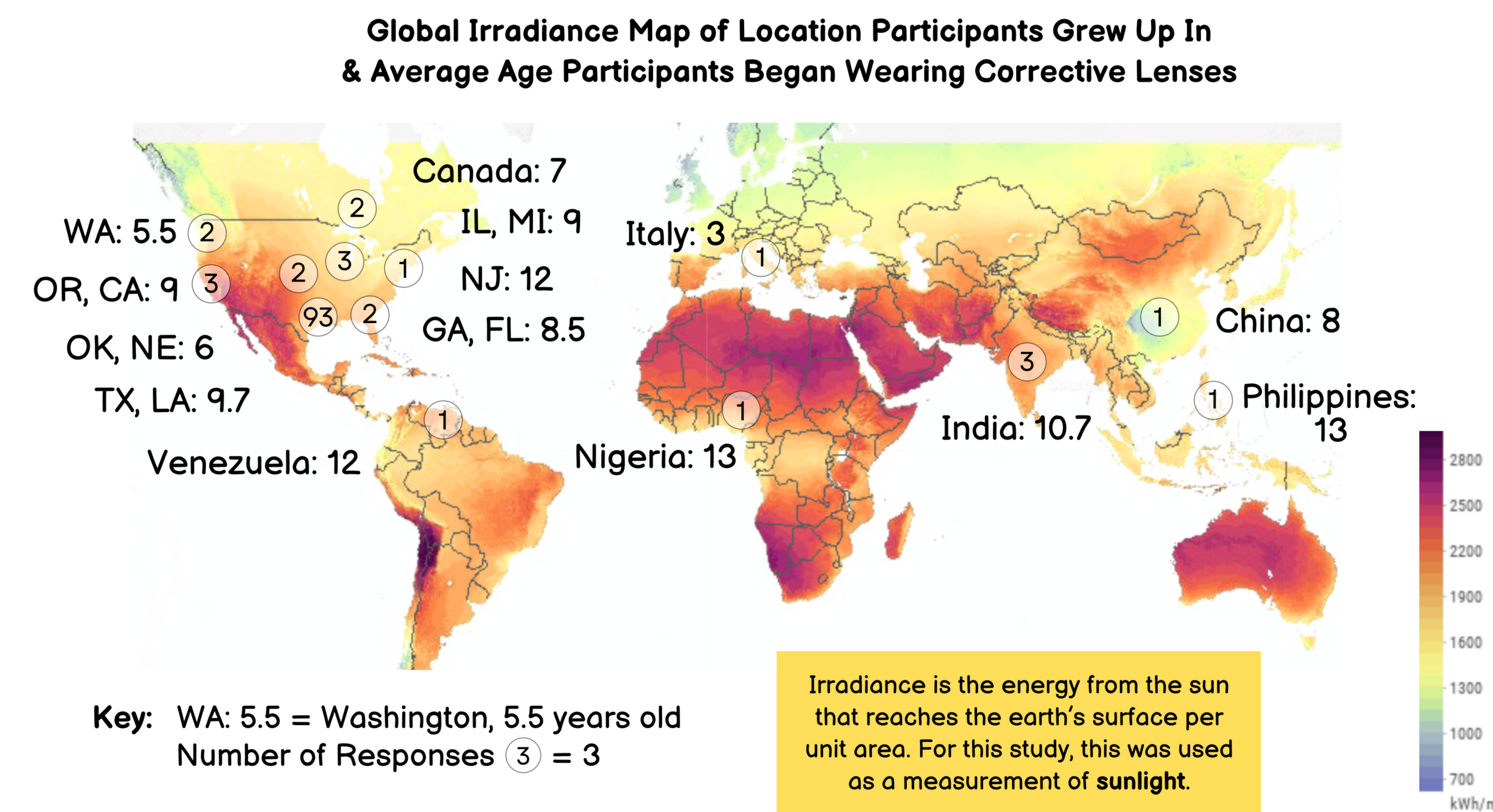
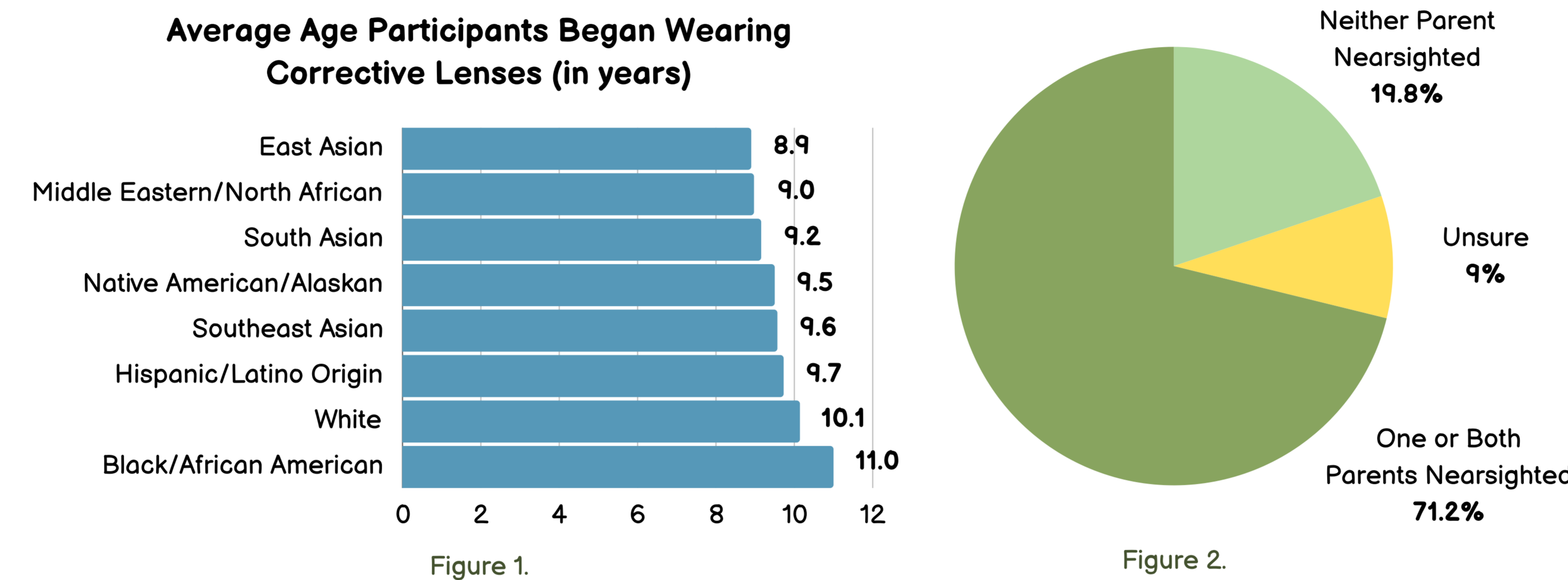
This research attempts to compare the prevalence and severity of nearsightedness in teenagers in Fort Bend ISD based on demographic information and behavioral activities throughout childhood to observe the conditions that contribute to myopia development.

## Methodology

A study was conducted via a survey posted in Colony Eye Care Center and Dulles High School in Sugar Land, Texas over twelve days, yielding usable data from 111 participants aged 14 to 20. Demographic information was collected including age, gender, race/ethnicity, and nearsightedness status. Excluding respondents who indicated no nearsightedness, background information such as corrective lens prescription (if known), parents’ nearsightedness status, and the age the participant began wearing corrective lenses was also taken. Lastly, environmental and behavioral questions were asked about the state or country the participant grew up in, the frequency of certain activities throughout their childhood, the number of hours per week spent outdoors during childhood, and the number of hours per week spent studying or doing homework throughout elementary, middle/high school, and college if applicable.

The data collected will be used to determine whether there is a relationship between certain genetic, environmental, and behavioral characteristics and the development of myopia throughout childhood.

## Results



## Findings

East Asian individuals tend to receive vision correction for nearsightedness at a younger age, while Black/African American individuals tend to receive correction at an older [Figure 1]. The majority of nearsighted participants also have one or more parents who are nearsighted [Figure 2]. Regionally, most of the respondents grew up in Texas with an average first vision correction at 9.7 years old. It’s notable that the average ages in Washington and Canada, areas that receive less sunlight, are lower than those in southern U.S. states that receive more sunlight. The highest averages recorded were in the Philippines and Nigeria, the latter of which has one of the greatest irradiance levels in the data [Figure 3]. Additionally, people with prescriptions on the lower end (-0.25 to -1.75) and the higher end (-8.00+) were seen to read both rarely and frequently during childhood [Figure 4]. Low and high prescriptions were also observed on both sides of the weekly time spent outdoors during childhood, with most participants indicating 5-8 hours [Figure 5].

## Discussion

Grouping race and parental myopia as nature and childhood location, time spent reading, and time outdoors as nurture, the argument of the two’s roles in the development of myopia remains unclear. While the study’s results of the age of first corrective lenses and the occurrence of myopia in parents and children may be similar to global statistics, the pattern in sunlight exposure based on location and time outdoors during childhood yields a variety of results. In some instances, more sunlight and outdoor time matched up with later ages of eye correction and lower prescriptions, but other cases did not fit the same expectations, making it difficult to draw conclusions. Similarly, although it was expected that frequent reading throughout childhood would contribute to higher prescriptions, the data collected did not show a clear association between the two. The accuracy of the study was limited by its small sample size and the likelihood of participant error when answering open-ended questions about the past. Future research on this topic would benefit from tracking the progression of myopia in younger children along with their environmental and behavioral factors.

The larger the prescription is, the stronger the corrective lenses are. People with more myopia have a higher minus prescription.