Project Myopia

Leong Guang Shian 3S3 09 (Leader)
Ian Poon 3S1 12
Tay Hong Ming 3S3 30

Content

1. Introduction

With the recent digitalisation of the world, most of the human population will face many eye diseases caused by increased usage of mobile phones and other electronic devices. As of now, over 2500 million people are suffering from myopia. It is clear that myopia is a serious issue that needs to be addressed. Singapore has one of the highest cases of myopia in the world. 28% of children as young as seven years old are myopic. Eight out of 10 Singaporeans who are 18 years and above are myopic.

Our project aims to investigate and verify the factors that contributed to high myopia rate of people. Our project's focus is to use data science to verify the factors that can cause myopia through comparison between the U.S.A. and Singapore. We will process such data and release it to the public via an interactive tableau site.

2. Literature Review/Case study

(I) Myopia

Fredrick, D. R. (2002). *Myopia*. Retrieved January 19, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1123161/

Shortsightedness is becoming more common. The author of this study, Douglas Fredrick, describes recent research into this condition and discusses future management of patients.

The paper first defines myopia as well as the author's methods of writing the review paper which include searching Medline for citations of articles in English using the keyword "myopia." In addition, abstracts from the annual meetings of the Association for Research in Vision and Ophthalmology were reviewed.

The paper states the models for the development of myopia (**Retinal Blur**, **Accommodation Problems** and **Familial Factors**) which we are targeting for as we try to verify his ideas of them being factors of myopia.

(II) An evidence-based update on myopia and interventions to retard its progression

Leo, S. W. (2013). *An evidence-based update on myopia and interventions to retard its progression*. Retrieved January 19, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3688263/

This study looks into myopia being the most common human eye disorder. This article summarises the current literature regarding myopia epidemiology, genetics, animal model studies, risk factors, and clinical treatments and also outlines published treatment strategies to retard the progression of myopia in children, such as pharmacologic agents, progressive addition lenses and neural adaptation programs.

The article states that recent epidemiological data has identified outdoor activity as a key environmental determinant of myopia. Many interventions aimed at retarding the progression of myopia are suggested but it is highlighted that few of these interventions have been subjected to the scientific rigors of randomised controlled trials.

(III) Myopia: its historical contexts

Jong, P. T. V. M. (2015). *Myopia: its historical contexts*. Retrieved January 20, 2019 from https://bjo.bmj.com/content/102/8/1021

Around 1720, it was already discovered that excessive length of the eye is a possible cause of myopia and people are advised against attentively looking at small things or reading fine script. At the beginning of the 19th century, it was pointed out that myopia was much more prevalent in higher social classes, and smoking is a risk factor for myopia. It is found that myopia occurred more in children, more often in brown-haired persons than in blond ones, and that hereditary myopia was not rare. The most common cause of myopia is a congenital and hereditary defect. Children from myopic parents usually become myopic too. Myopia is not restricted to gender too.

It is also stated in the article that myopia was more common in civilised countries and without doubt was most common in persons who from early youth on had to observe small objects while reading, writing, drawing, embroidering or sewing.

(IV) Myopia

Health Promotion Board. (n.d.). *Myopia*. Retrieved January 20, 2019 from https://www.healthhub.sg/a-z/diseases-and-conditions/118/topic_myopia

The article states that myopia is a condition caused by the focal point of a visual image falling in front of the retina instead of directly on it and that Singapore has one of the highest rates of myopia in the world. It further states that the actual cause of myopia is not clearly known but **genetic** as well as **environmental** factors play a part in the development of the condition. Studies have found that a child is more likely to develop myopia if he has one or both parents who are myopic and is constantly involved in near-work activities such as reading, writing, watching TV, or playing computer games. Furthermore, myopia usually develops in children of school-going age, and continues to worsen until they reach their early 20s, after which the condition usually stabilises. Myopic people may display symptoms of blurred vision, headaches from straining eyes and squinting.

Summary of Literature Reviews

It can be summarised from the above literature reviews that possible factors that contribute to myopia include **nearwork** (such as observing small objects while reading, writing or drawing), **hereditary**, **gender** and **urbanisation** have already been identified as early as 17th to 19th century. These factors are still contributing factors in the current 21st century and are similar to our current data from Singapore and survey.

3. The Study and Methodology

We are working on an eye focusing disorder and its prevalence among young children and teenagers. We aim to educate the public and raise awareness about the prevalence of myopia through investigation of the factors that cause it.

Firstly, we use data from Hosmer, D.W., Lemeshow, S. & Sturdivant, R.X. (2013).*Applied Logistic Regression, 3rd ed.* New York: Wiley. and visionproblemsus.org to identify data related to vision problems in U.S.A.. We process the data in RStudio, and obtained the graphs and tables via Tableau.

Secondly, we obtain data from https://iovs.arvojournals.org/article.aspx?articleid=2125441#89769788, **a Cohort Study of Incident Myopia in Singaporean Children** done in 2006.

Lastly, we conducted a survey via google forms aiming to find out more information on myopia in Singapore. Below is the QR code to our survey:

Link to survey:
https://docs.google.com/forms/d/e/1FAIpQLSdZsyjBT0UM50kerP44ApuPLK3n3_V1jgjLjdZCec7R6hPhzQ/viewform?usp=sf_link

Screenshots of the Rstudio codes, Sample U.S.A., Singapore and Survey Data and the use of Tableau on the extracted relevant data can be found in the **Annex**.

Timeline

Our timeline is as follows:

Jan-Feb: Submission of proposal
Feb: Validation by mentor
Feb-April: Learn about the different data sources
T1 Sabbatical Week: Learn the skills to extract and combine the data
2 April: Proposal Evaluation
April-May: Application
May-June: Data analysis and representation
June-July: Document results and progress
4 July: Mid-Term Evaluation
July-August: Prepare for presentation of findings
7 August: Final Evaluation

Job distribution

Our job distribution for this project is as follows:

Ian Poon	Coder of data extraction algorithms
Hong Ming	Analysis of data and presenting them as data charts
Guang Shian	Incorporating the data into slides and documenting progress

4. Outcomes, Analysis and Discussions

4.1 Data Analysis of U.S.A data

Data from Hosmer, D.W., Lemeshow, S. & Sturdivant, R.X. (2013).Applied Logistic Regression, 3rd ed. New York: Wiley. and visionproblemsus.org was used to determine some factors that contribute to myopia. This data set consists of 9 columns: State, Latitude, Longitude, race, sex, age, number_of_cases, prevalence_rate, population. The time of this study is 2013, and includes all states of USA.

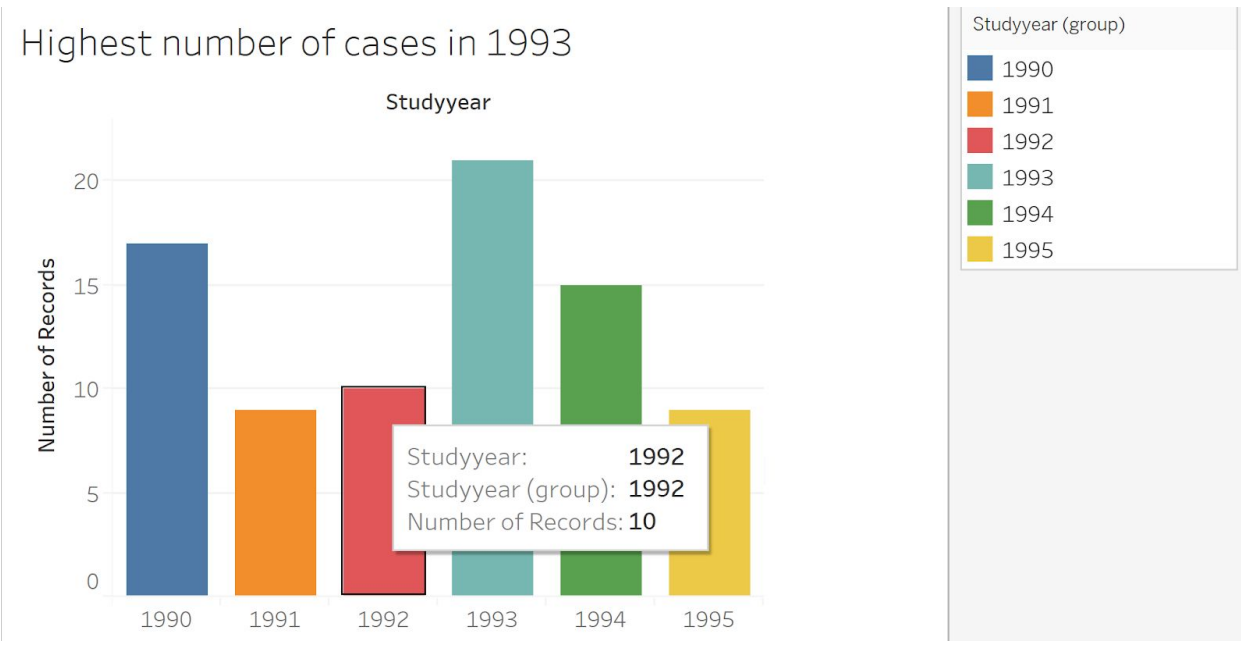


Fig 4.1.1

Fig 4.1.1 shows that for U.S.A., the highest number of myopia records is in 1993. It shows that technological advancement and mindsets of people are factors of myopia.

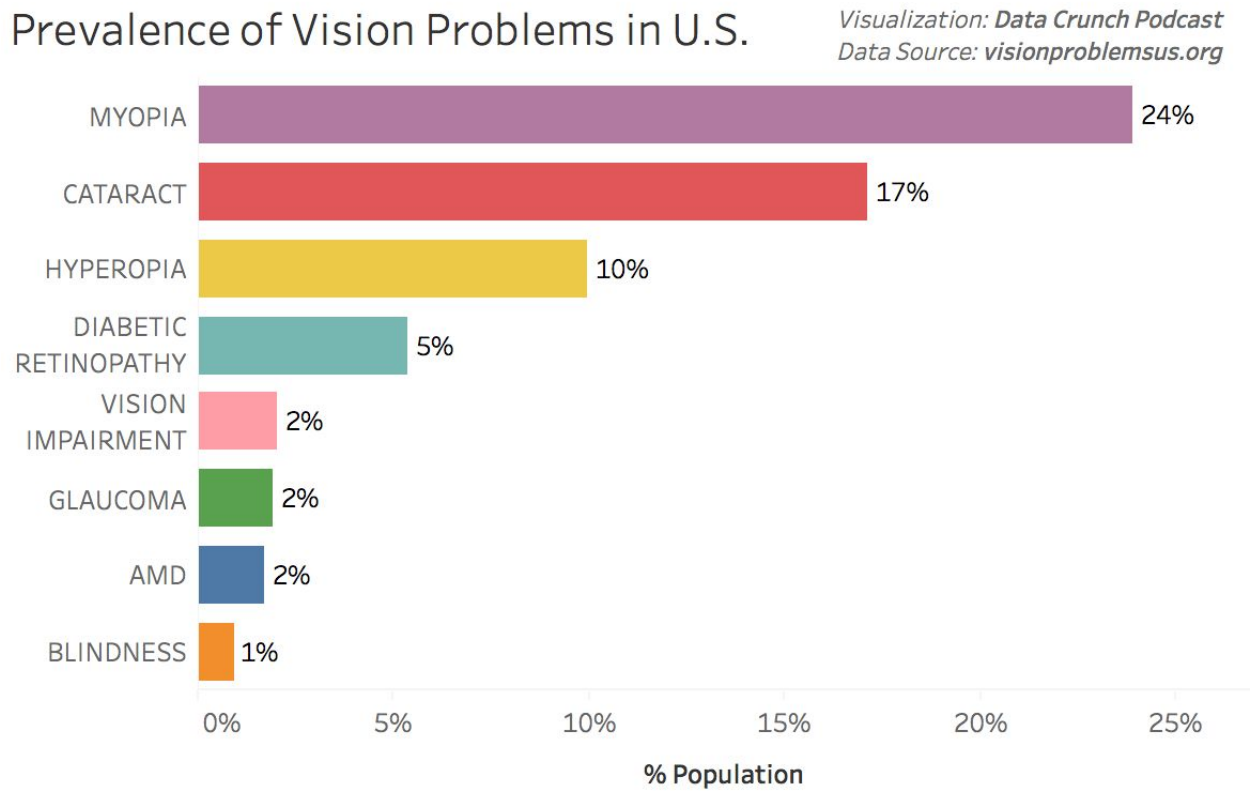


Fig 4.1.2

Fig 4.1.2 shows that among the possible eye diseases contracted by the citizens of U.S.A. , myopia is the most prevalent, emphasising the importance of myopia research.

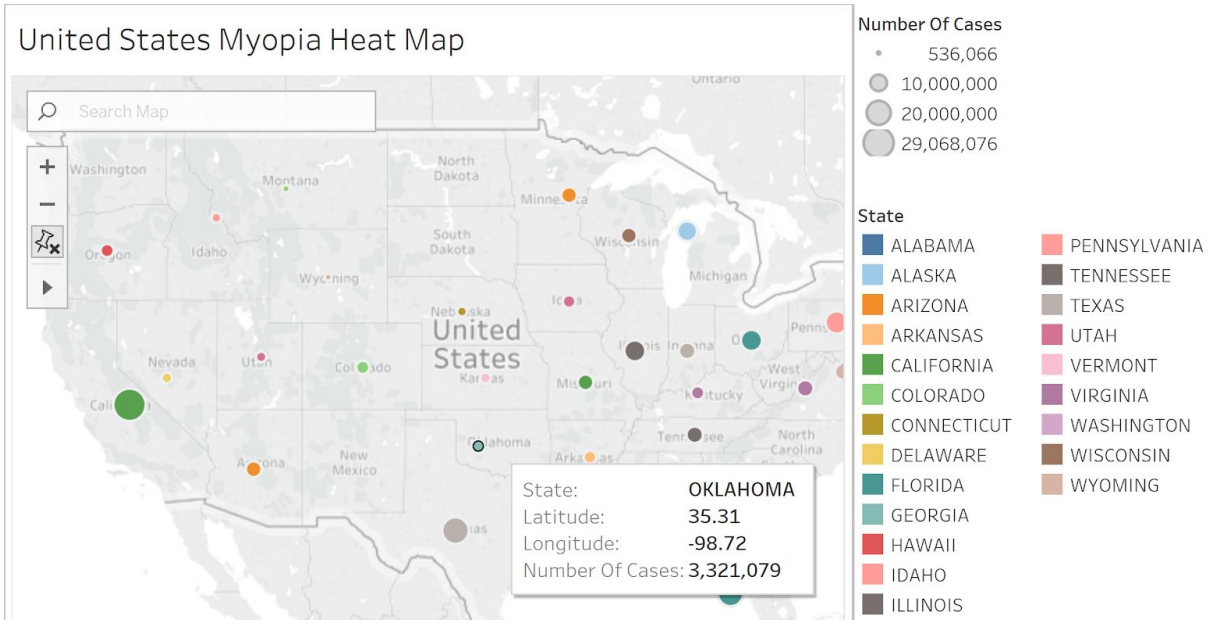


Fig 4.1.3

Fig 4.1.3 shows that myopia is more prevalent in urban states.

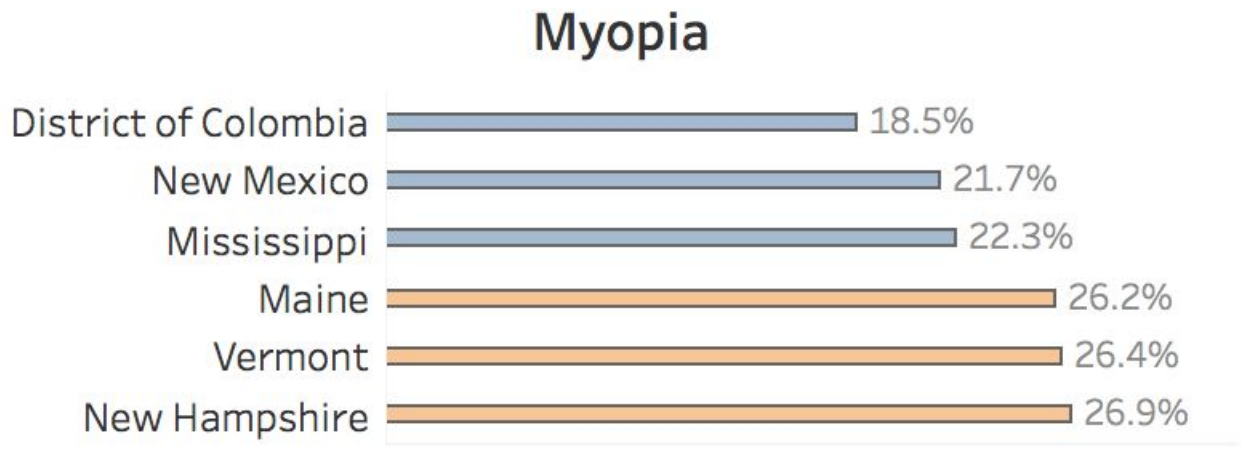


Fig 4.1.4

Fig 4.1.4 shows the myopia rates for the different states of U.S.A., highlighting the relationship between living environment and myopia.

4.2 Data Analysis of the Singapore data

This is a 3-year follow-up study of Singaporean children aged 7 to 9 years who were not myopic at the start of the study. The study uses multivariate analysis to measure the correlation between the different possible factors that may increase the likelihood of developing myopia such as genetics, intelligent quotient and gender etc.

It uses a few statistical tools such as $\chi 2$ (Chi Square Test) and Cox Proportional Hazard Model to analyse the data collected.

We also extracted out the relevant data by restricting the degree of myopia to 75.

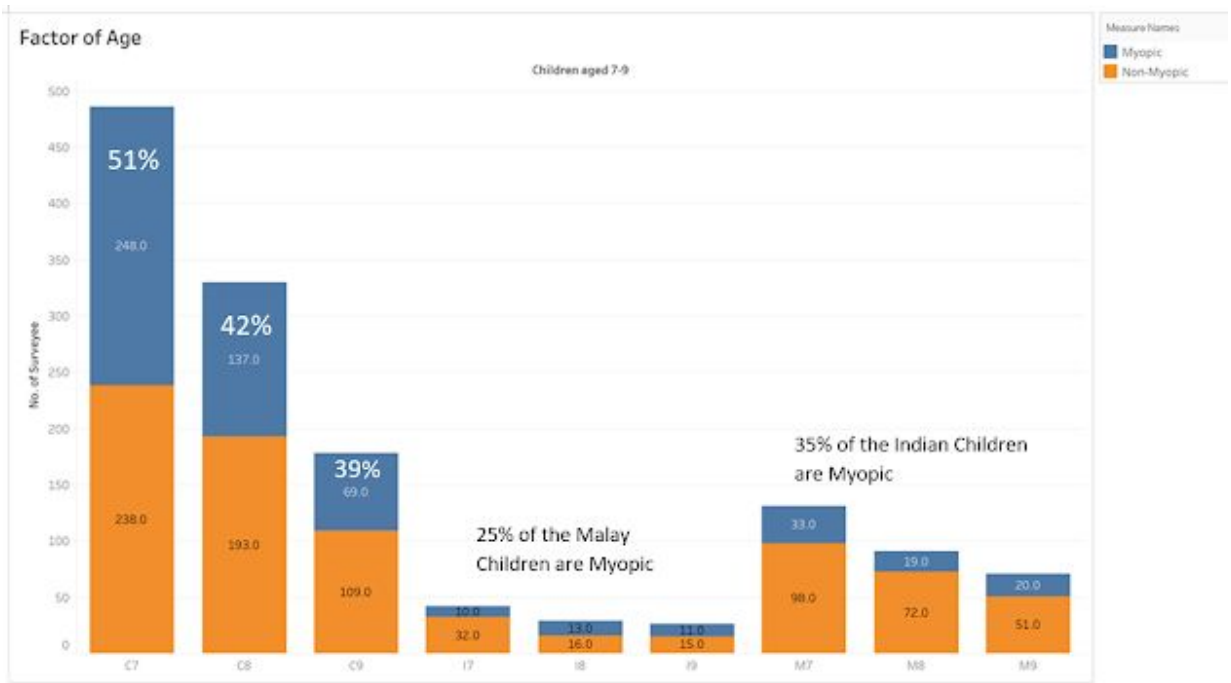


Fig 4.2.1

Fig 4.2.1 shows that at young ages, an increase in age seems to yield lower rates of myopia.

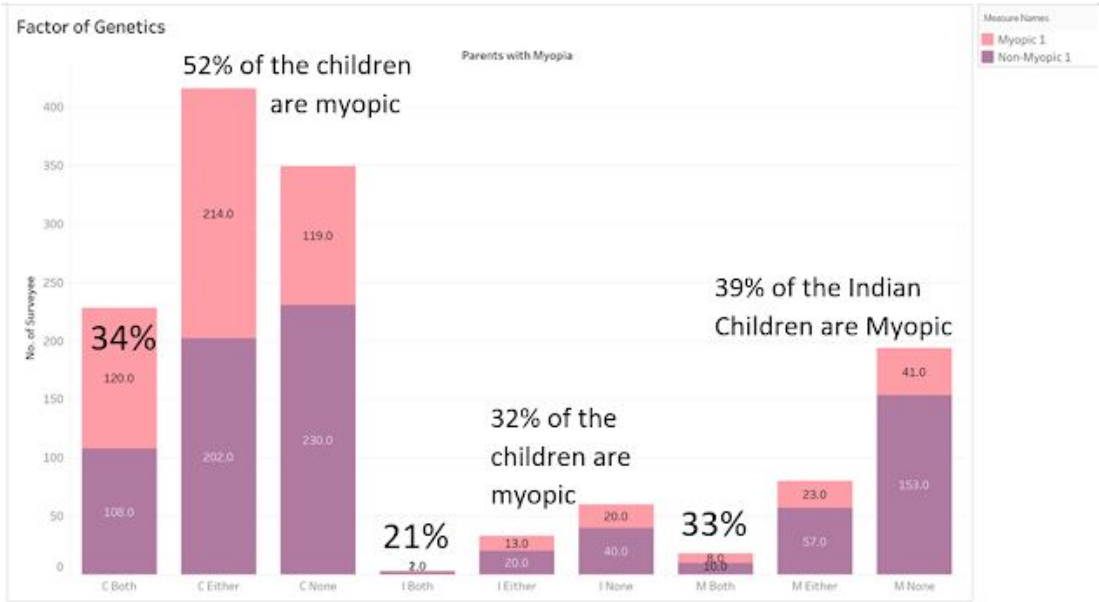


Fig 4.2.2

Fig 4.2.2 shows that across all the three survey groups, either parent or both parents having myopia increase the likelihood of the child developing myopia.

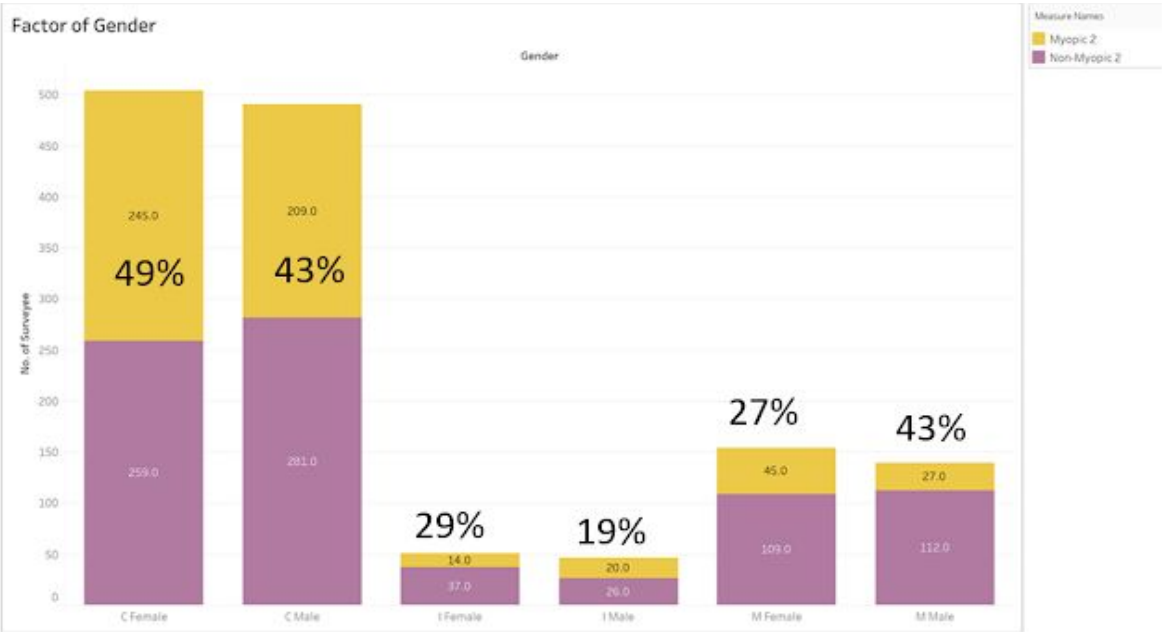


Fig 4.2.3

Fig 4.2.3 indicates that gender does play a part in determining whether a child develops myopia.

Conclusion of the Singapore Data

It is disturbing to note that at a young age of 7 to 9 years old, a significant portion of the respondents are already myopic. The 3 year cohort study concludes that **age**, **parental myopia** and **gender** are significant risk factors for myopia and this relationship remains significant in Chinese children. It also states that their findings are not conclusive for Malays and Indians because of their small number in the study.

4.3 Data Analysis of the Survey

A month-long survey was carried out throughout Singapore with surveyee aged 7 to 80, to provide a fair comparison to U.S.A. data. However, it is important to note that the small sample size of 100 may be biased in nature.

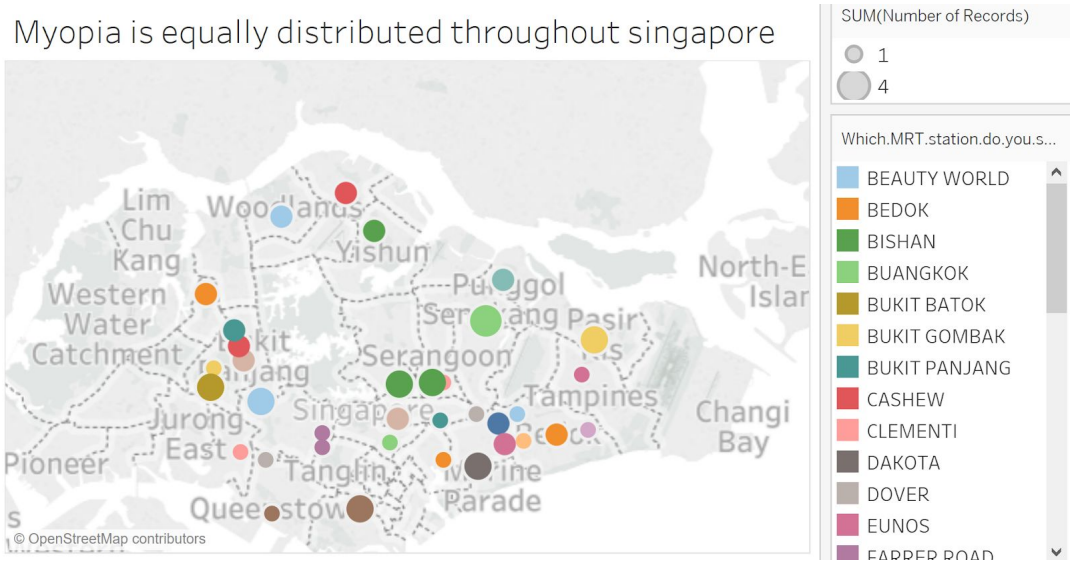


Fig 4.3.1

Fig 4.3.1 shows that myopia is evenly distributed among Singapore. This is comparable to the data from U.S.A. (**Fig 4.1.3**) where myopia rate is higher in the urban areas. Since Singapore is an urban city, the even distribution is expected.

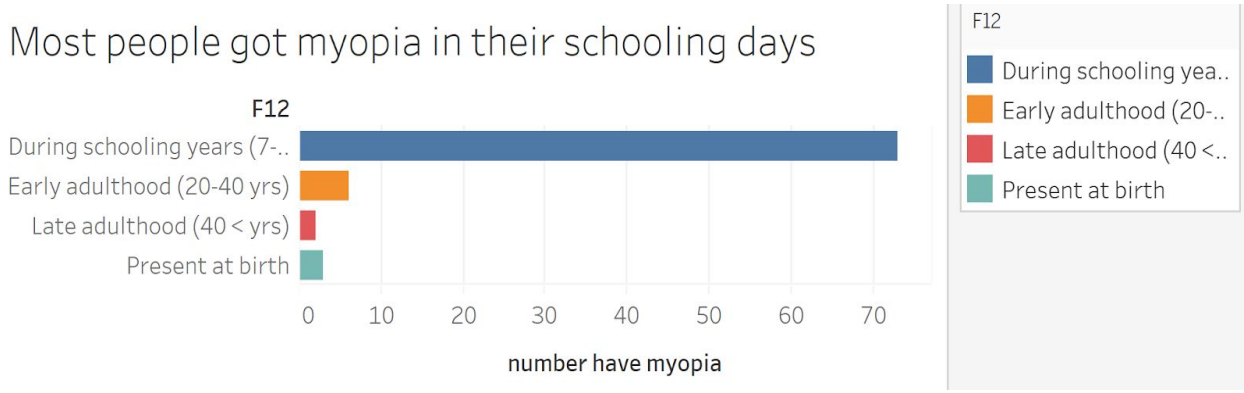


Fig 4.3.2

Fig 4.3.2 shows that schooling years seem to have the most significant impact on the rates of myopia.

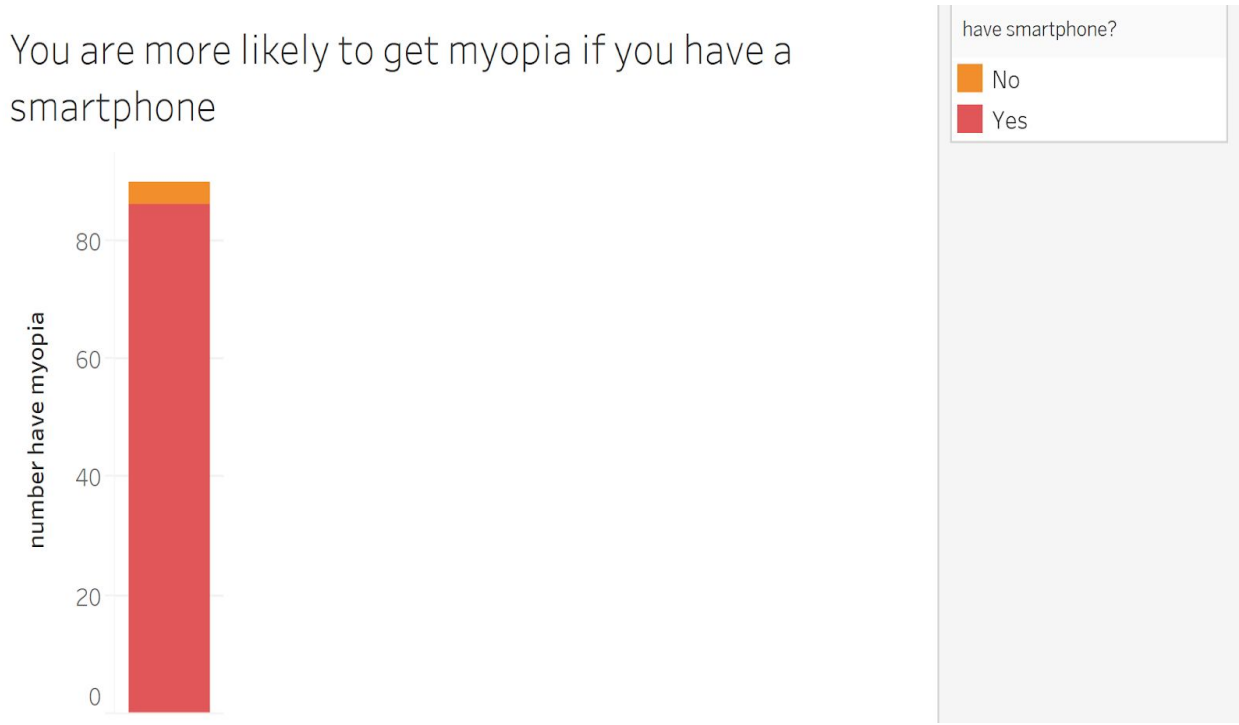


Fig 4.3.3

Fig 4.3.3 justifies that owning a smartphone also contributes to high rates of myopia.

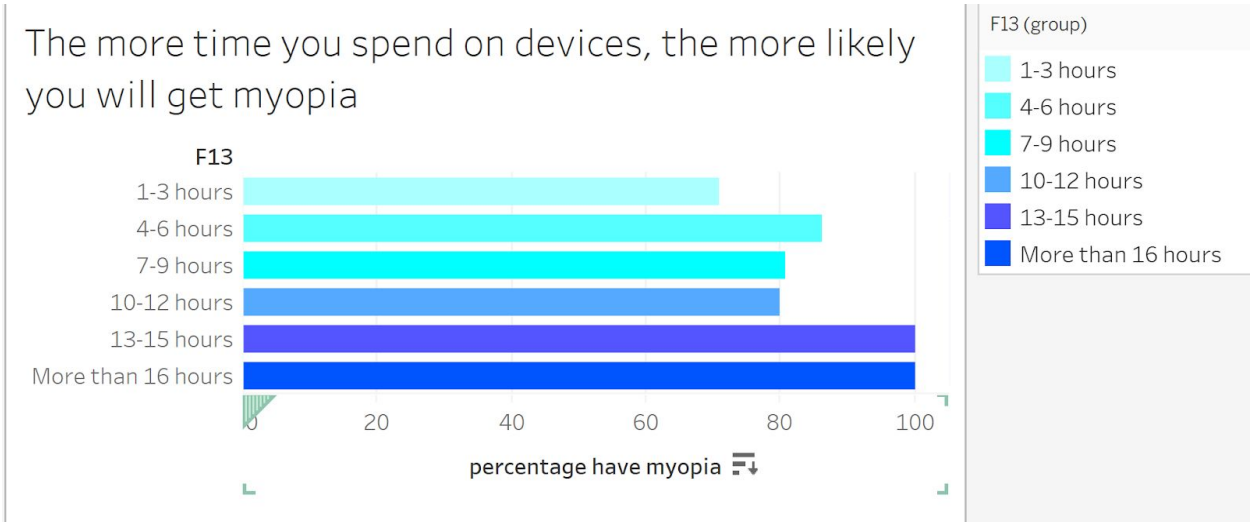


Fig 4.3.4

Fig 4.3.4 shows that the longer the screen time, the more likely one is to develop myopia.

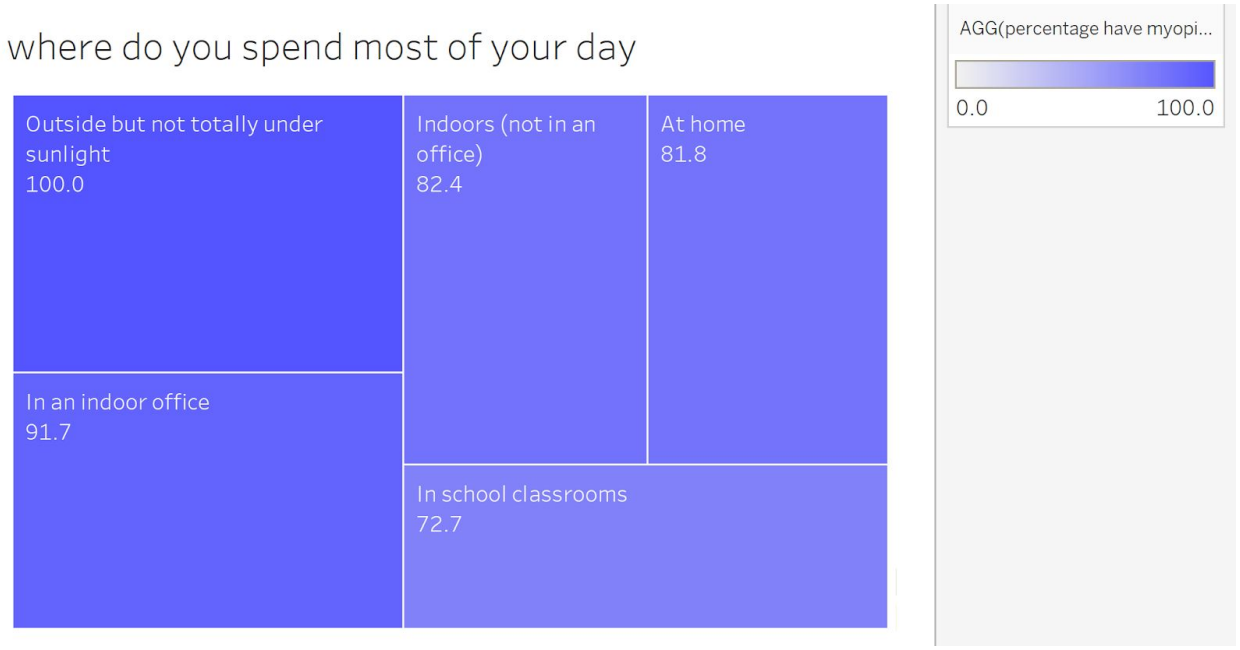


Fig 4.3.5

Fig 4.3.5 demonstrates that being indoors (classroom or otherwise) can contribute to myopia.

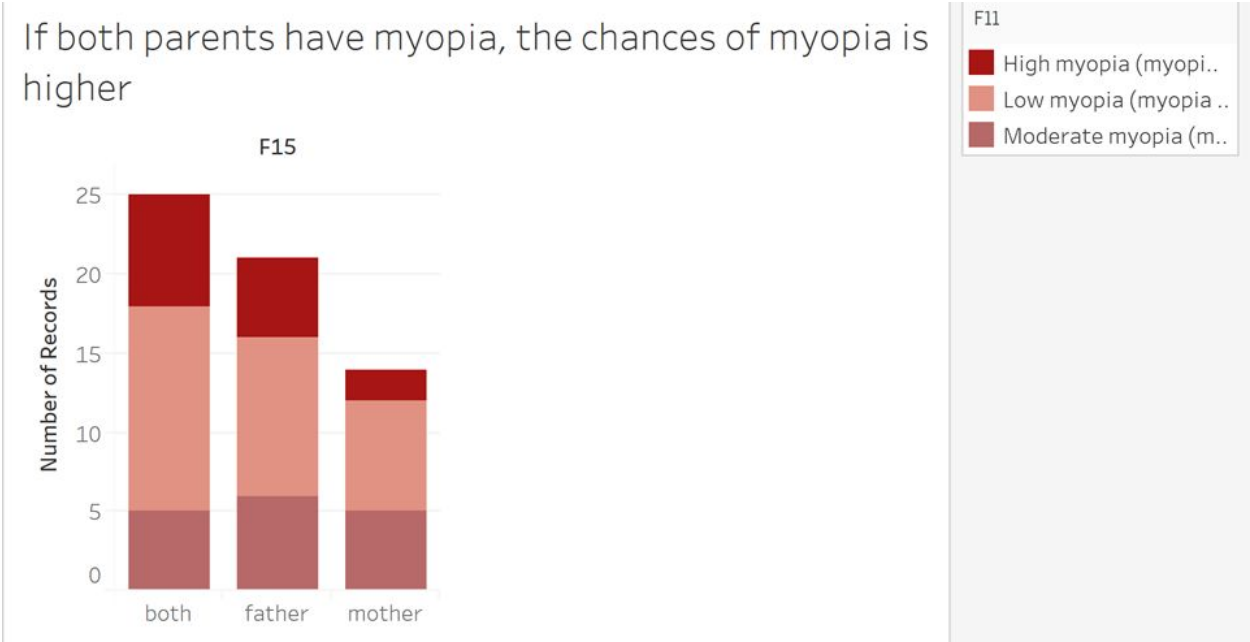


Fig 4.3.6

Fig 4.3.6 demonstrates that ancestry is a significant contributor to myopia.

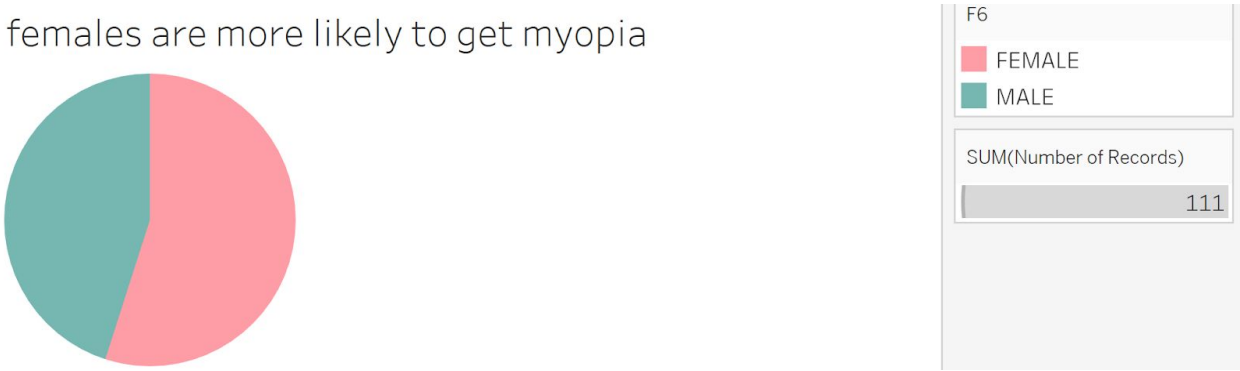


Fig 4.3.7

Fig 4.3.7 demonstrates that gender can also influence myopia. This is in tandem with our findings in the USA data.

5. Implications and Recommendations

Severe myopia (600 degrees or more) can lead to several severe complications:

- Retinal detachment
- Macular degeneration
- Glaucoma
- Cataract

These 4 can contribute to a loss of vision and blindness that cannot be corrected with glasses or contact lenses.

From our data collection and analysis, certain factors such as

- Genetics
- Gender
- Possession of electronic device
- Amount of time spent on electronic device
- Amount of time of time spent indoors

do play a part to myopic rates. Other factors yield inconclusive results due to a lack of data.

A proposed improvement to our project will be to collect relevant data on these main factors and further analyse them using data sciences. We can also increase our data set to verify other factors.

6. Conclusion

From this project, we learned how to use different types of software such as RStudio, Python and Tableau which aided us in the analysis and representation of the data. We also learned that there are numerous contributing factors of myopia, such as gender, genetics and ownership of mobile phones etc and that we should protect our eyes from a young age, especially in the most prone schooling-ages.

Thus, we need to be aware of our risks of myopia by taking note of our family history of myopia and other genetic factors like age. From there we should work to reduce the factors of myopia by spending less time on mobile phones and reducing exposure to sunlight by not going outdoors at noon-time excessively. Simple measures include taking 5min eye breaks every 30min of screen time.

Raising awareness about measures and contributing in the Singapore population should also be the next step in furthering the value of this project.

7. Bibliography and Citations

1. Brien Holden Vision Institute, (n.d.). *Myopia - Growing Prevalence*. Retrieved February 1, 2019 from https://www.brienholdenvision.org/myopia-prevalence.html

2. British Journal Of Ophthalmology. (May, 2001). *Myopia In Singapore: Taking A Public Health Approach*. Retrieved March 2, 2019 from https://bjo.bmj.com/content/85/5/521

3. Fredrick, D. R. (2002). *Myopia*. Retrieved January 19, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1123161/

4. Health Promotion Board. (n.d.). *Myopia*. Retrieved January 20, 2019 from https://www.healthhub.sg/a-z/diseases-and-conditions/118/topic_myopia

5. Hosmer, D.W., Lemeshow, S. & Sturdivant, R.X. (2013).*Applied Logistic Regression, 3rd ed.* New York: Wiley.

6. Jong, P. T. V. M. (2015). *Myopia: its historical contexts*. Retrieved January 20, 2019 from https://bjo.bmj.com/content/102/8/1021

7. Leo, S. W. (2013). *An evidence-based update on myopia and interventions to retard its progression*. Retrieved January 19, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3688263/

8. Ministry of Health Singapore, (2019). *Myopia*. Retrieved from February 1, 2019 from https://www.healthhub.sg/search?k=myopia

9. Prevent Blindness America. (2012). *Vision Problems In The U.S.* . Retrieved March 2, 2019 from visionproblemsus.org

10. The Association for Research in Vision and Ophthalmology, Inc. (2006). *A Cohort Study of Incident Myopia in Singaporean Children*. Retrieved June 1, 2019 from https://iovs.arvojournals.org/article.aspx?articleid=2125441#89769788

11. What's Behind The High Rate Of Childhood Myopia? (2019, January 7). *The Straits Times*, p. 11. Retrieved February 1, 2019 from NewspaperSG

Annex

(A) Screenshot of codes for U.S.A. Data

```
.Rhistory*
df1 <- data.frame(LAT, dfindex = 1:26)
df2 <- data.frame(long, dfindex = c(1:10,15,20,22:35))
merge(df1, df2)
merge(df1,df2, all=TRUE)
names(df1) <- c("index", "state")
merge(df1, df2, by.x = "state", by.y = "dfindex")
```

For what we used to process the data, using R, we removed null values in the graph such as those with unspecified states like "state=United States or state=null etc". We did so by using a filter function within R. Next we retrieved a data set online on the latitude and longitude of each state. We combined the current dataset with the latitude longitude dataset by setting a common criteria for merging. In this case, we made the column names of state column of both data sets the same and capitalised the names of all states on both datasets with an in-built function in R. Finally we changed the names of the columns of the original dataset as they used short-forms/jargon like "LT" which stands for "lens length" so when reflected in Tableau , it is easier for the viewer to understand the data. Then we could generate the relevant graphs in tableau like the heat map which requires the longitude and latitude.

(B) Screenshot of sample U.S.A. Data

250	ALABAMA	32.6010112	-86.6807365	HYPEROPIA	WHITE	MALE	75-79	8346	0.1939	43042
251	ALABAMA	32.6010112	-86.6807365	HYPEROPIA	WHITE	MALE	80+	10532	0.2238	47055
252	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	ALL	525188	0.2333	2250750
253	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	40-49	227291	0.3457	657440
254	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	50-54	84911	0.2444	347485
255	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	55-59	62715	0.2011	311906
256	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	60-64	48051	0.174	276127
257	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	65-69	32880	0.1568	209637
258	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	70-74	23726	0.1475	160864
259	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	75-79	18082	0.1472	122836
260	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	ALL	80+	27532	0.1674	164455
261	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	FEMALE	ALL	285575	0.2379	1200473
262	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	FEMALE	40-49	124177	0.37	335630
263	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	FEMALE	50-54	45391	0.2539	178760
264	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	FEMALE	55-59	33276	0.2051	162273
265	ALABAMA	32.6010112	-86.6807365	MYOPIA	ALL	FEMALE	60-64	25216	0.1745	144524
266	ALABAMA	32.6010112	-86.6807365	CATARACT	WHITE	MALE	60-64	14008	0.1378	101663
267	ALABAMA	32.6010112	-86.6807365	CATARACT	WHITE	MALE	65-69	17507	0.223	78503
268	ALABAMA	32.6010112	-86.6807365	CATARACT	WHITE	MALE	70-74	19787	0.3374	58645
269	ALABAMA	32.6010112	-86.6807365	CATARACT	WHITE	MALE	75-79	20158	0.4683	43042
270	ALABAMA	32.6010112	-86.6807365	CATARACT	WHITE	MALE	80+	30555	0.6493	47055
271	ALABAMA	32.6010112	-86.6807365	DIABETIC_RETINOP	ALL	ALL	ALL	117199	0.0521	2250750

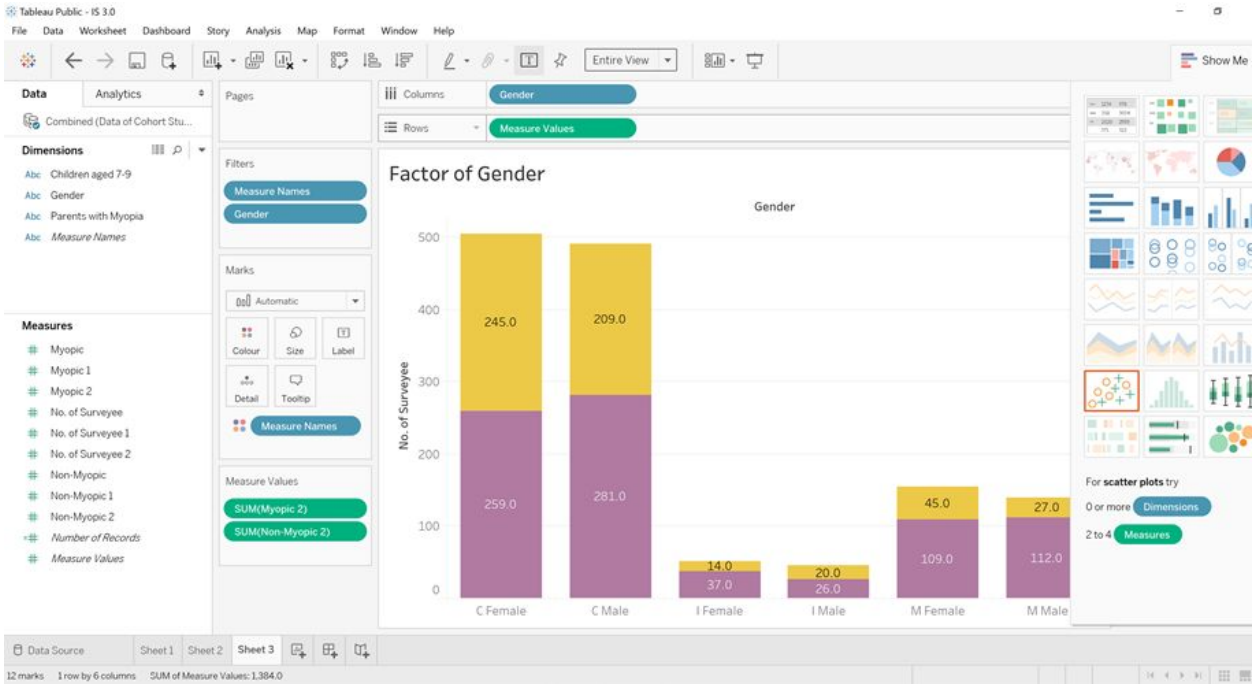
(C) Screenshot of Sample Singapore Data

TABLE 1.

Factors Associated with Incident Myopia

	At Risk (*n*)	Cases (*n*)	Crude RR Myopia at least −0.75 D (95% CI)	Age, Sex, Income RR Myopia at least −0.75 D (95% CI)	Multivariable RR* Myopia at least −0.75 D (95% CI)
Age (y)					
9	178	69	1 (Referent)	1 (Referent)	1 (Referent)
8	330	137	1.06 (0.79–1.42)	1.00 (0.74–1.35)	1.08 (0.80–1.45)
7	486	248	1.35 (1.03–1.76)	1.32 (1.00–1.73)	1.42 (1.07–1.87)
Gender					
Male	490	209	1 (Referent)	1 (Referent)	1 (Referent)
Female	504	245	1.19 (0.99–1.43)	1.19 (0.99–1.43)	1.21 (1.01–1.46)
Parental income (Singapore dollars)					
2000 or below	239	96	1 (Referent)	1 (Referent)	1 (Referent)
2001 to 5000	410	184	1.17 (0.92–1.49)	1.17 (0.92–1.49)	1.01 (0.76–1.29)
Above 5000	318	163	1.40 (1.10–1.79)	1.44 (1.12–1.84)	1.11 (0.84–1.45)
Parents with myopia					
None	349	119	1 (Referent)	1 (Referent)	1 (Referent)
Either	416	214	1.63 (1.31–2.04)	1.57 (1.24–1.98)	1.56 (1.24–1.98)
Both	228	120	1.70 (1.32–2.19)	1.58 (1.20–2.08)	1.55 (1.18–2.04)

(D) Screenshot of Tableau on Singapore Data



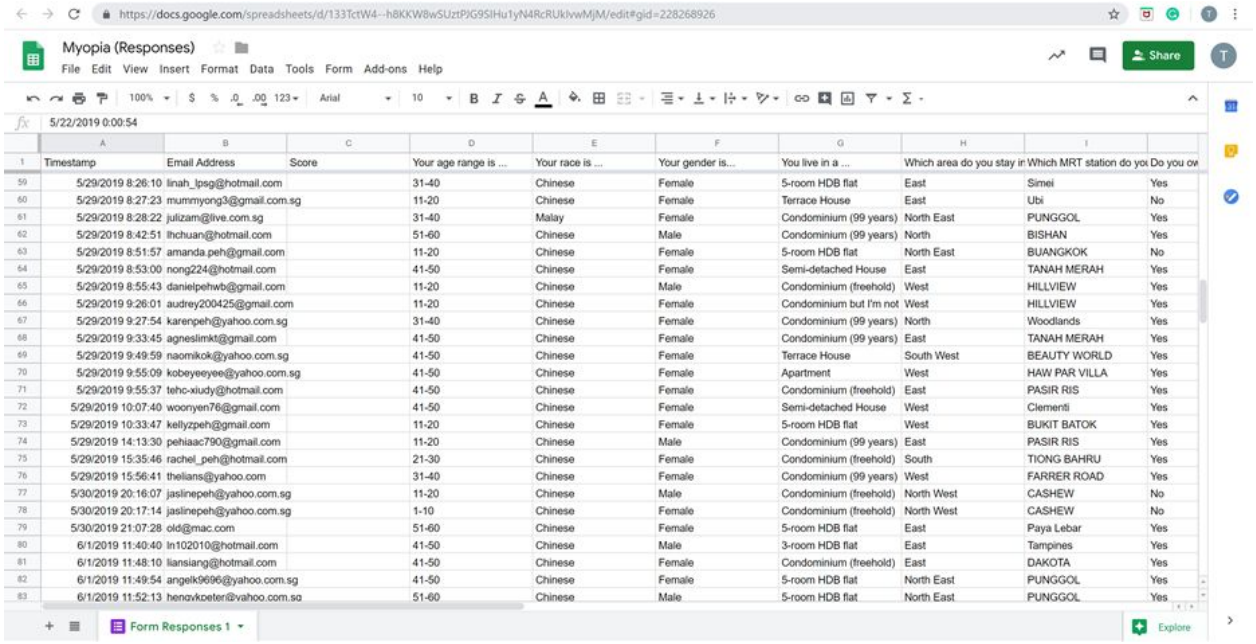
(E) Screenshot of codes for Survey Data

```
.Rhistory

getwd()
setwd("C:/Users/poon_/downloads")
getwd()
library(readxl)
read_xlsx("Myopia Singapore Lat and Long.xlsx")
mrt<-read_xlsx("Myopia Singapore Lat and Long.xlsx")
mrtc<-mrt
colnames(mrtc)[1]
colnames(mrtc)[1]="Which.MRT.station.do.you.stay.the.nearest.to...
mrtc$Which.MRT.station.do.you.stay.the.nearest.to...Capital.letter
.you.stay.the.nearest.to...Capital.letters..e.g..TAN.KAH.KEE.)
mrtc
my<-read.csv("myopia1.csv")
myc<-my
k<-merge(myc,mrtc)
k
write.csv(k,"sgmerged.csv")
```

First, I set the file location to access my dataset, which is in excel(.xlsx). Thus I used an external R library to read the excel dataset. I wanted to generate a heatmap for the dataset, thus i used the given information of the nearest mrt station to the participant's home as a rough estimate of their area of residence. I then loaded another dataset on the latitude and longitude of MRT stations in Singapore. Like the USA data, i set common criteria for merging by capitalizing the mrt station names on both datasets and making the column names the same. Then I did some data cleaning such as removing repeated entries, entries with missing information like gender and unnecessary columns generated by google forms.

(F) Screenshot of sample Survey Data



https://docs.google.com/spreadsheets/d/133TctW4--h8KKW8wSUztPJG9SIHu1yN4RcRUkIvwMjM/edit#gid=228268926

Myopia (Responses)

File Edit View Insert Format Data Tools Form Add-ons Help

5/22/2019 0:00:54

	A	B	C	D	E	F	G	H	I	
1	Timestamp	Email Address	Score	Your age range is ...	Your race is ...	Your gender is...	You live in a ...	Which area do you stay in	Which MRT station do you	Do you ov
59	5/29/2019 8:26:10	linah_lpsg@hotmail.com		31-40	Chinese	Female	5-room HDB flat	East	Simei	Yes
60	5/29/2019 8:27:23	mummyong3@gmail.com.sg		11-20	Chinese	Female	Terrace House	East	Ubi	No
61	5/29/2019 8:28:22	julizam@live.com.sg		31-40	Malay	Female	Condominium (99 years)	North East	PUNGGOL	Yes
62	5/29/2019 8:42:51	lhchuan@hotmail.com		51-60	Chinese	Male	Condominium (99 years)	North	BISHAN	Yes
63	5/29/2019 8:51:57	amanda.peh@gmail.com		11-20	Chinese	Female	5-room HDB flat	North East	BUANGKOK	No
64	5/29/2019 8:53:00	nong224@hotmail.com		41-50	Chinese	Female	Semi-detached House	East	TANAH MERAH	Yes
65	5/29/2019 8:55:43	danielpehwb@gmail.com		11-20	Chinese	Male	Condominium (freehold)	West	HILLVIEW	Yes
66	5/29/2019 9:26:01	audrey200425@gmail.com		11-20	Chinese	Female	Condominium but I'm not	West	HILLVIEW	Yes
67	5/29/2019 9:27:54	karenpeh@yahoo.com.sg		31-40	Chinese	Female	Condominium (99 years)	North	Woodlands	Yes
68	5/29/2019 9:33:45	agneslimkt@gmail.com		41-50	Chinese	Female	Condominium (99 years)	East	TANAH MERAH	Yes
69	5/29/2019 9:49:59	naomikok@yahoo.com.sg		41-50	Chinese	Female	Terrace House	South West	BEAUTY WORLD	Yes
70	5/29/2019 9:55:09	kobeyeeyee@yahoo.com.sg		41-50	Chinese	Female	Apartment	West	HAW PAR VILLA	Yes
71	5/29/2019 9:55:37	tehc-xiudy@hotmail.com		41-50	Chinese	Female	Condominium (freehold)	East	PASIR RIS	Yes
72	5/29/2019 10:07:40	woonyen76@gmail.com		41-50	Chinese	Female	Semi-detached House	West	Clementi	Yes
73	5/29/2019 10:33:47	kellyzpeh@gmail.com		11-20	Chinese	Female	5-room HDB flat	West	BUKIT BATOK	Yes
74	5/29/2019 14:13:30	pehiaac790@gmail.com		11-20	Chinese	Male	Condominium (99 years)	East	PASIR RIS	Yes
75	5/29/2019 15:35:46	rachel_peh@hotmail.com		21-30	Chinese	Female	Condominium (freehold)	South	TIONG BAHRU	Yes
76	5/29/2019 15:56:41	thelians@yahoo.com		31-40	Chinese	Female	Condominium (99 years)	West	FARRER ROAD	Yes
77	5/30/2019 20:16:07	jaslinepeh@yahoo.com.sg		11-20	Chinese	Male	Condominium (freehold)	North West	CASHEW	No
78	5/30/2019 20:17:14	jaslinepeh@yahoo.com.sg		1-10	Chinese	Female	Condominium (freehold)	North West	CASHEW	No
79	5/30/2019 21:07:28	old@mac.com		51-60	Chinese	Female	5-room HDB flat	East	Paya Lebar	Yes
80	6/1/2019 11:40:40	ln102010@hotmail.com		41-50	Chinese	Male	3-room HDB flat	East	Tampines	Yes
81	6/1/2019 11:48:10	liansiang@hotmail.com		41-50	Chinese	Female	Condominium (freehold)	East	DAKOTA	Yes
82	6/1/2019 11:49:54	angelk9696@yahoo.com.sg		41-50	Chinese	Female	5-room HDB flat	North East	PUNGGOL	Yes
83	6/1/2019 11:52:13	hengykoeter@yahoo.com.sg		51-60	Chinese	Male	5-room HDB flat	North East	PUNGGOL	Yes

Form Responses 1

(G) Further Complications and Dangers of myopia

The complications that can occur from high degree of myopia include:

- **Retinal Detachment**

It is a medical emergency where the child's retina (inner layer of the eye) becomes separated from the eyeball. Other than myopia, it can be caused by genetic factors, or a severe blow to the eye. Seek medical help because it could result in blindness.

- **Glaucoma**

There is increased fluid pressure within the eyeball and the child's optic nerve, which transmits visual impulses from the eye to the brain, could become damaged. Glaucoma develops gradually and may not be detected until a later stage.

- **Macular Degeneration**

This is where the central part of the retina, which gives the clearest vision, degenerates, resulting in the child experiencing dark patches in his vision or other visual distortion.

- **Amblyopia or "Lazy Eye"**

Sometimes, as children grow, their eyes may not develop normal vision. This leads to a big difference in the degree of myopia between the two eyes. To prevent blurred vision, the brain reads the image from the "stronger" eye and not from the "weaker" eye. As a result, the visual abilities of the "weaker" eye do not develop well, and the child experiences reduced vision in one eye.

- **Cataract**

The clouding of the lens in the eye leads to blurred vision and can make reading difficult for the child.

(H) Solutions to prevent or treat Myopia

We also created a video and a poster that aim to let the general public find out more information on myopia and the solutions to prevent or treat Myopia.

Below is the QR code to our video:

Link to our video:
https://drive.google.com/open?id=1Q-6ZihAlywPbg-F0DtXxUFH7XsnaX7Ya

Poster: