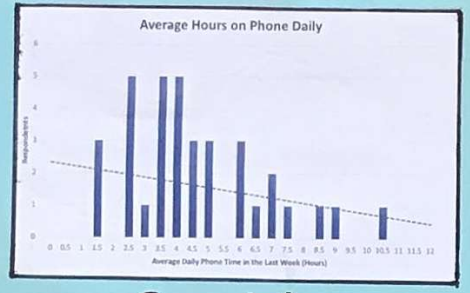
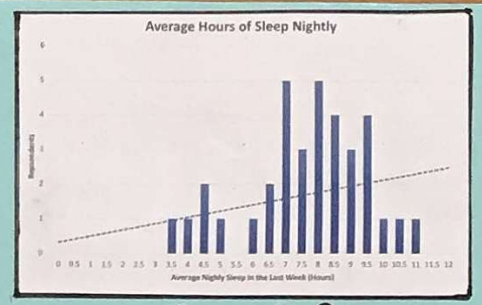
The Relationship Between Phone Time and Sleep



Graph 1



Graph 2

***Aim*:**
To determine whether a correlation is present between phone time and sleep amongst adolescents.

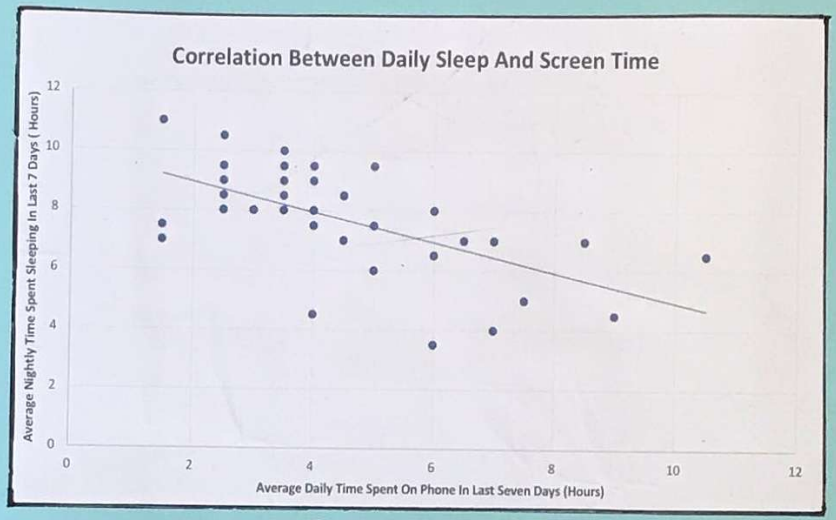
***Hypothesis*:**
If an adolescent's phone time is above average, then it is probable that their sleep will not be, and vice versa, as natural melatonin production is diminished by phone usage, incurring a difficulty to sleep.

Method:
Finding a Question:
The Australian Department of Health recommends 8-10 hours of sleep nightly for young people aged 14-17, a guideline that is disobeyed by many in the age bracket. A common assumption is that the time adolescents spend on their phone is the reason for the widespread failure to sleep 8 hours, and as sleeping is such an indubitably crucial factor on human wellbeing, a potential cause of sleep hindrance should be investigated.

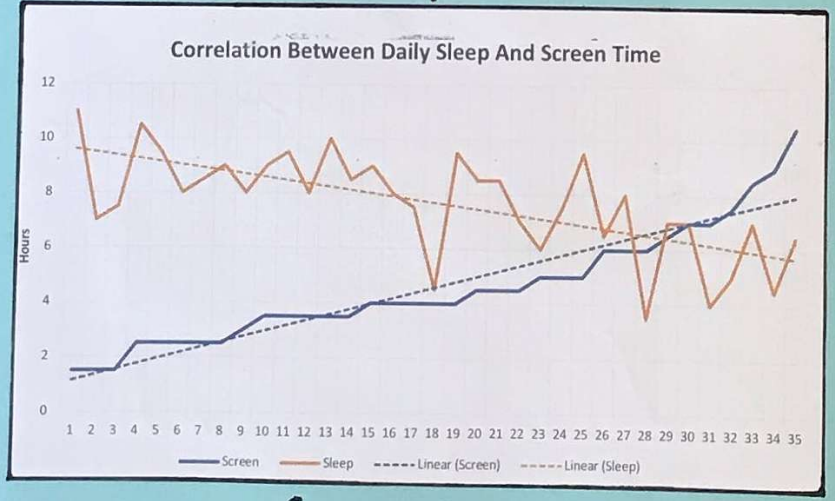
Gathering Data:
In order to determine whether the time an individual (aged 14-17) spends on their phone correlates to time spent sleeping (if suboptimal time spent sleeping is an issue at all), both variables must be measured. A survey was created on Google Forms and issued to 35 respondents within the age bracket, who were requested to provide their average daily phone time over the last week (attainable via phone settings), what they spent most of their phone time doing (attainable via phone settings, their average nightly sleep over the last week, and whether or not they thought that phone usage affects one's sleep duration.

Recording Data:
Upon receiving the results from the survey, four graphs were created using excel, two of which were univariate, the other two bivariate. In order to display the distribution of both sleep and phone time, without yet attempting to seek a correlation between the variables, two frequency distribution graphs were created, one for both sleep and phone time. Finally, in order to investigate the relationship between the variables, two bivariate graphs were created. A scatter plot and a double line graph both serve as a visual means of correlation.

Has Anyone Done Similar Research Before?
Nazish Rafique's 2020 study published in the National Center for Biotechnology Information (NCBI) is just one of the many that confirms a negative correlation between sleep and phone time, whether it be amongst adolescents or adults. His cross-sectional study was conducted on 1925 students, and similar to the vast majority of research on the matter, concluded that the blue light emitted by cell phones lessened melatonin production levels (a natural hormone that aids sleep) thus harming the duration and quality of sleep.



Graph 3



Graph 4

Analysing Univariate Data:
Both Graph 1 and Graph 2 are univariate frequency-distribution graphs, and display daily phone time and sleep respectively (averaged over the last week, amongst adolescents).

Phone Time:
Respondents averaged 4.57 hours a day on their phones, with a 2.14 standard deviation that informs of a 68% range between 2.43 - 6.71 hours, as answers spread throughout a total range of 9 (minimum: 1.5, maximum: 10.5). The data set boasted an interquartile range of 3 (Q1: 3, Q3: 6) and a median of 4, whilst the mode was shared by 2.5, 3.5 and 4 hours. The resulting histogram was unimodal, with a positive skew, and no outliers.

The results were of a concerning nature, the average phone time more than doubling the recommended maximum of 2 hours screen time amongst adolescents (Australian Institute of Family Studies), without even taking into account the usage of other devices. All three modes were above the recommendation, as was Q1, and by extension the median. Only 3 of the 35 respondents adhered to the 2 hour guideline, which is approximately 8.5%.

Sleep:
The average nightly sleep amongst respondents was 7.67 hours, and a standard deviation of 1.79 tells of a 68% distribution between 5.88 - 9.46 hours, whilst the total range of the data set was 7.5 (minimum: 3.5, maximum: 11). The interquartile range was 2 (Q1: 7, Q3: 9), the median 8, and the mode both 7 and 8. The histogram displaying the data proved to be unimodal, with a negative skew and no outliers.

Similar to phone time, the average response for nightly sleep failed to reach the recommended 8-10 hours by The Australian Department of Health, however the median, as well as one of two modes, met the recommendation. 17 of the 35 respondents met the recommended sleeping hours (approximately 48.5%), 40% more than that of the recommended screen time.

Comparison of Bivariate Data:
Graph 3 and Graph 4 are both bivariate (scatterplot and double line graph), and display a clear negative correlation (an inversely proportional relationship) in the dependent variables of phone time and sleep (visible through the scatterplot's negative-gradient trend line, and the double line graph's positive and negative trend lines).

Through the bivariate data set it can be found that the average daily phone time amongst those who had 8+ hours of nightly sleep was 3.29 hours, whereas the average for those who fell short of the 8 hour recommendation was 5.84 hours phone time. Such results would suggest that a 3 hour phone time recommendation would be perfectly viable. In fact, those with 2-3 hours of daily phone time actually slept an average of approximately 25 minutes more than those whose phone time fell between 0-2 hours.

Conclusion:
Ultimately, it is evident that a sub-optimal percentage of adolescents manage to achieve the recommended amount of time spent on their phone/sleeping. Additionally, the bivariate data set and graphs inform of the inverse effect that phone time has on sleep duration due to a lessening release of melatonin, answering the question and confirming the hypothesis. The reliability of the survey could of course be enhanced with a larger sample size, and if the findings within a larger group of respondents were the same, then an increase in the recommended daily phone time to 3 hours would be justified.