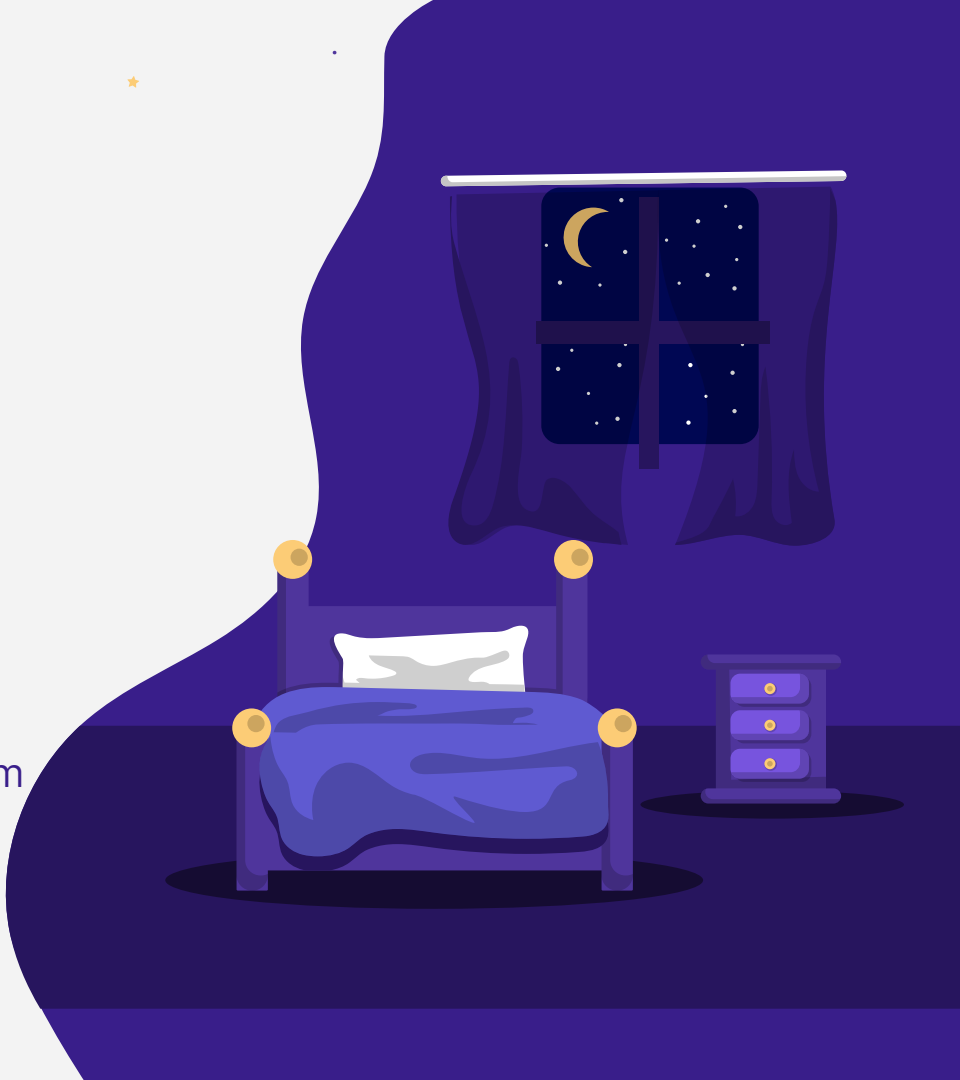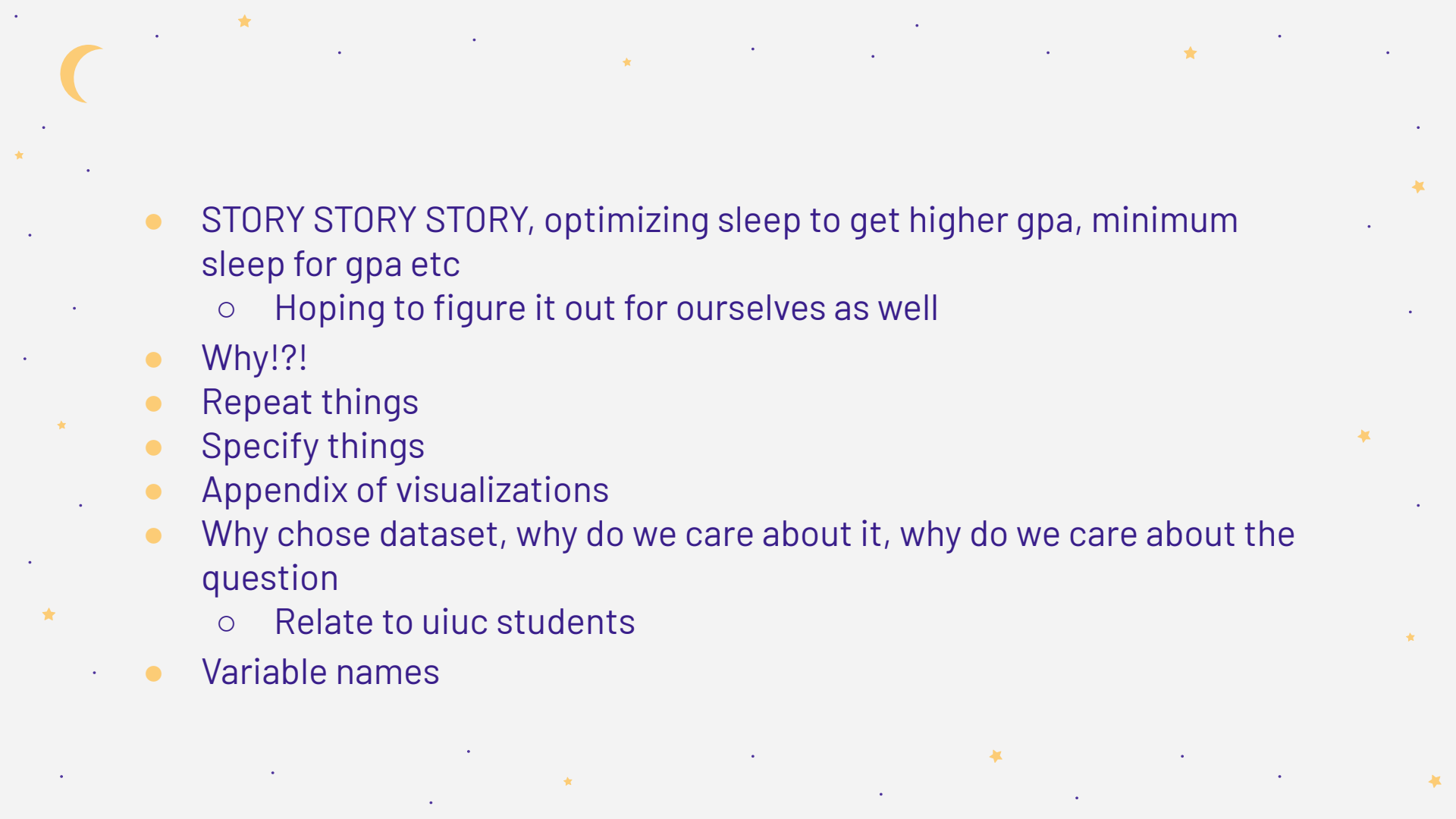# IDSC: Nap Navigators

Jeremy Chou · Jacob Kantayya · Zach Kim
Evan Ma · Ethan Nguyen · Jaitin Pallath

- STORY STORY STORY, optimizing sleep to get higher gpa, minimum sleep for gpa etc
  - Hoping to figure it out for ourselves as well
- Why!?!
- Repeat things
- Specify things
- Appendix of visualizations
- Why chose dataset, why do we care about it, why do we care about the question
  - Relate to uiuc students
- Variable names

Our Dataset

- Study from Carnegie Mellon University (CMU), University of Washington (UW), and Notre Dame University (ND)
  - 634 first-year students
  - Fitbits tracked sleep
- Data includes:
  - Average sleep duration
  - Average daytime sleep duration
  - Bedtime variability
- Also GPA scores
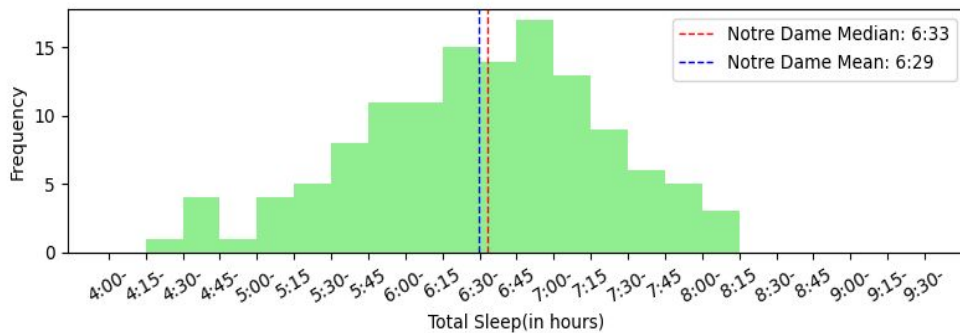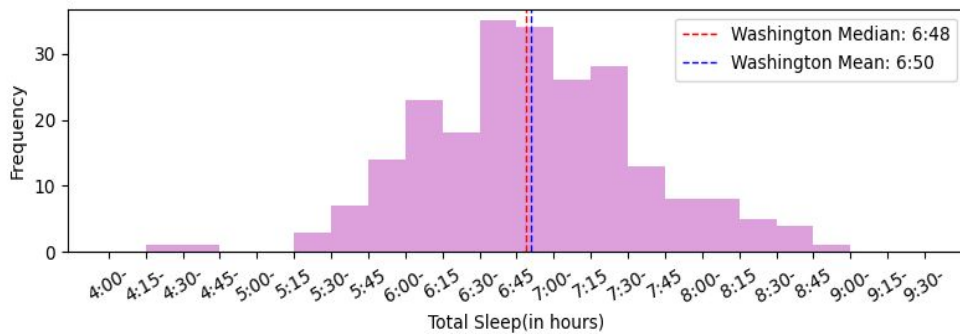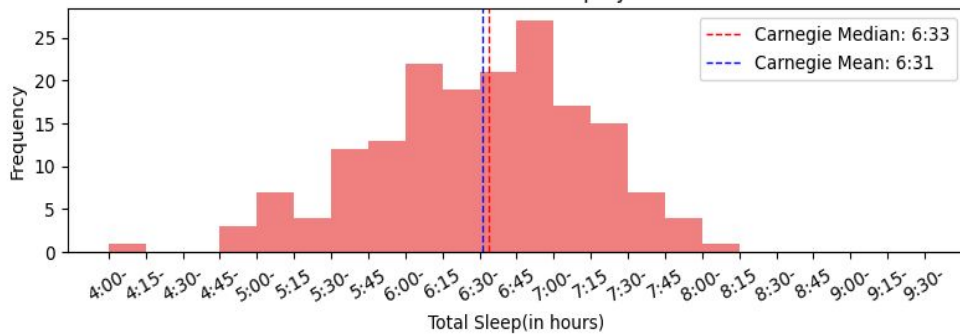 - Cumulative GPA
  - Term GPA

Our Question

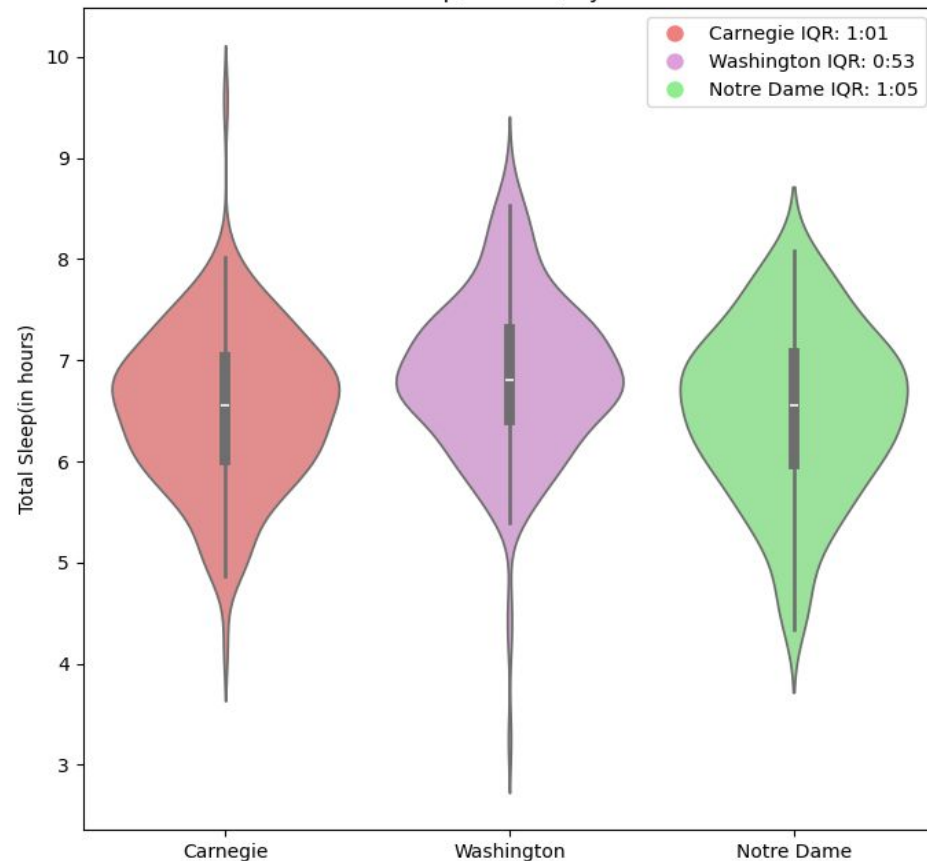How can a predictive model utilize sleep habits to forecast GPA for college freshmen?

Data Cleaning

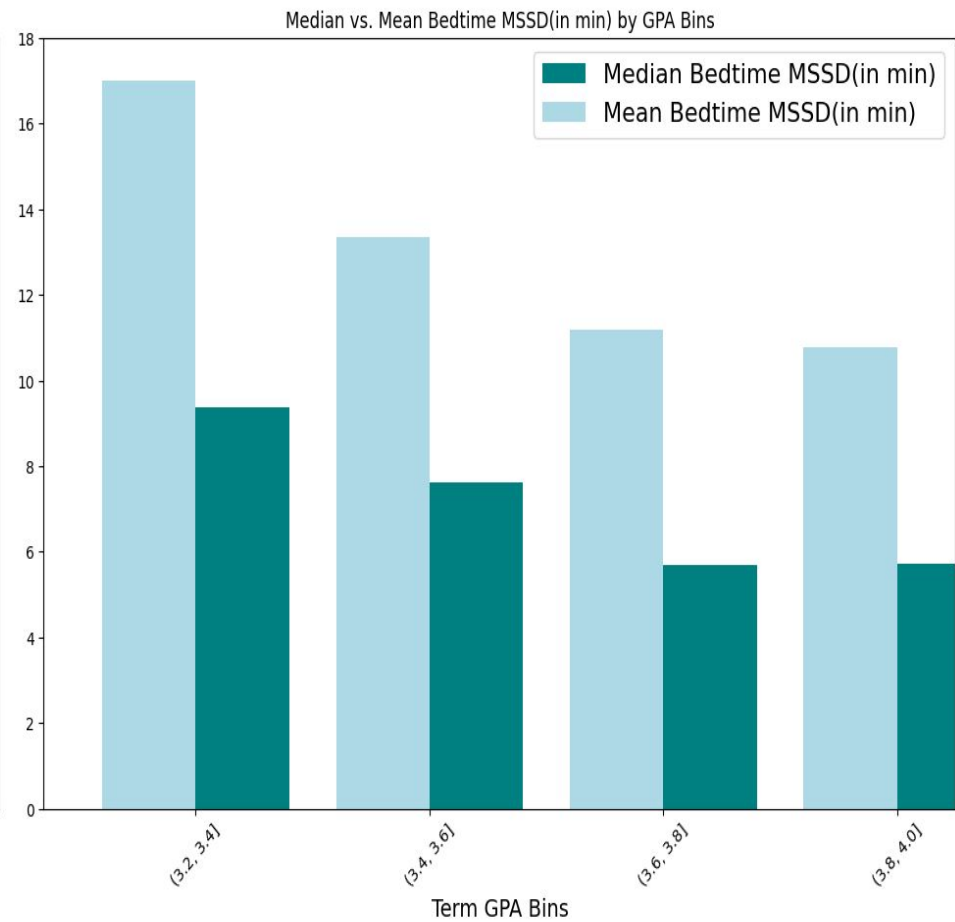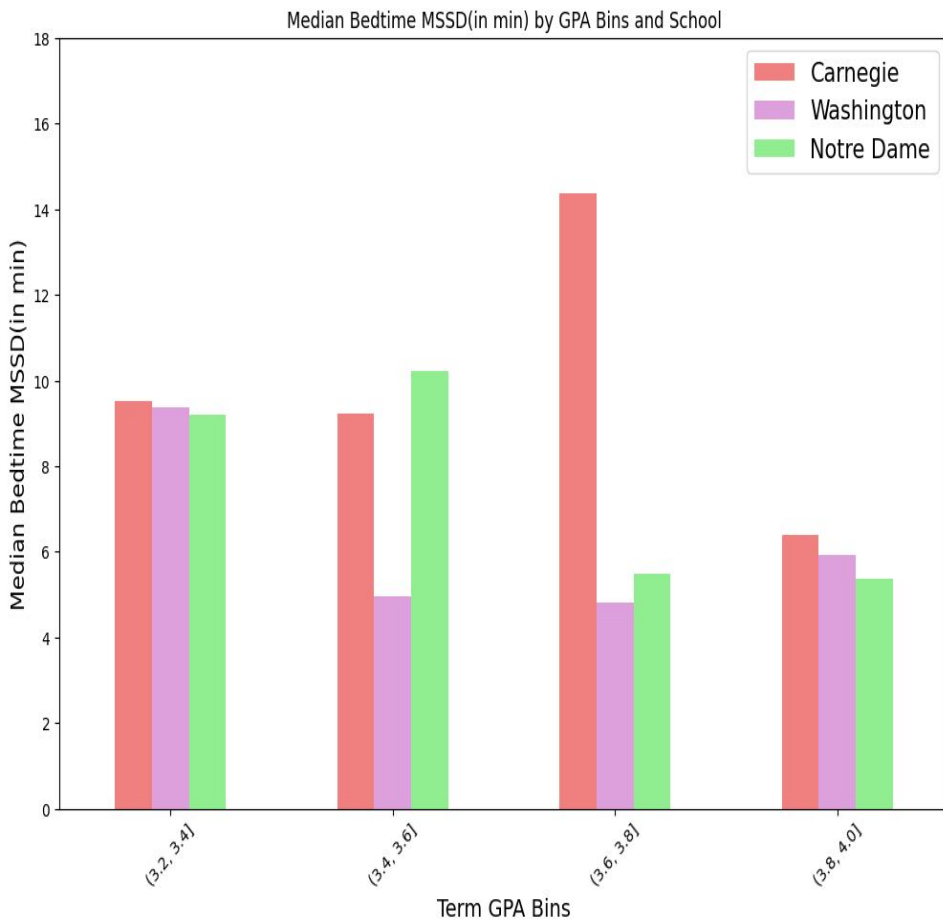CMU's Data Repository curates datasets and did most of the cleaning

For our analysis, we removed participants who recorded less than 5 nights per week

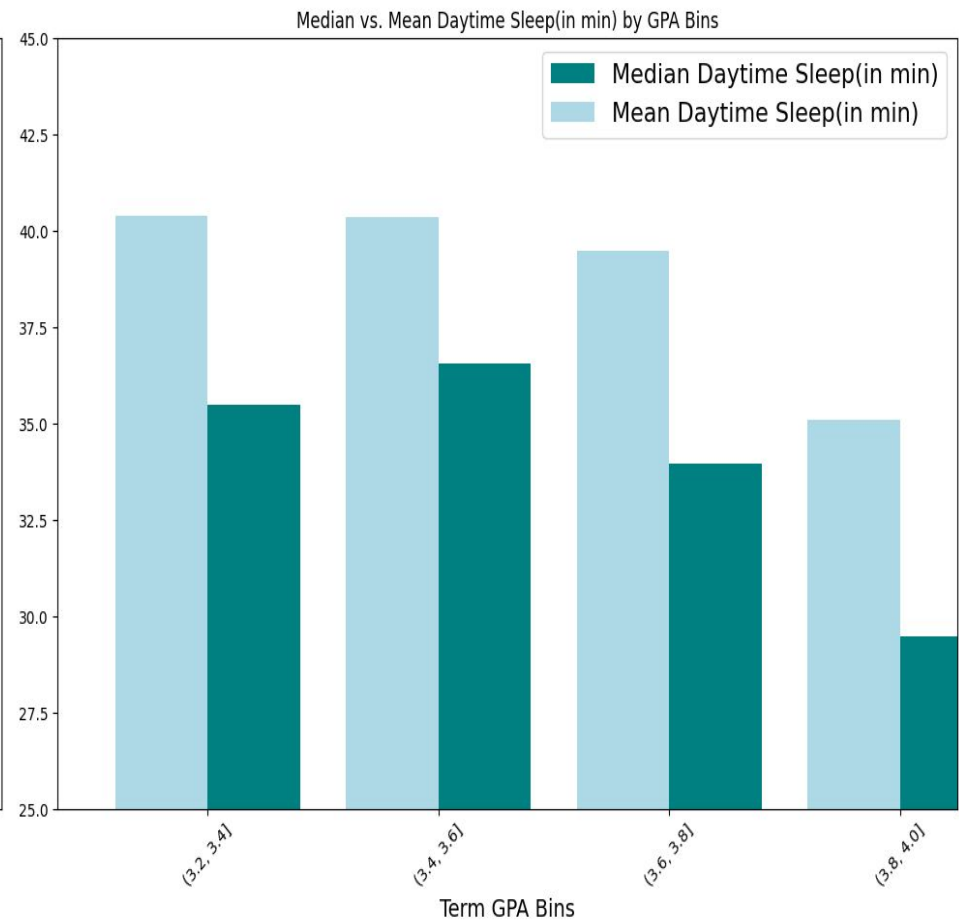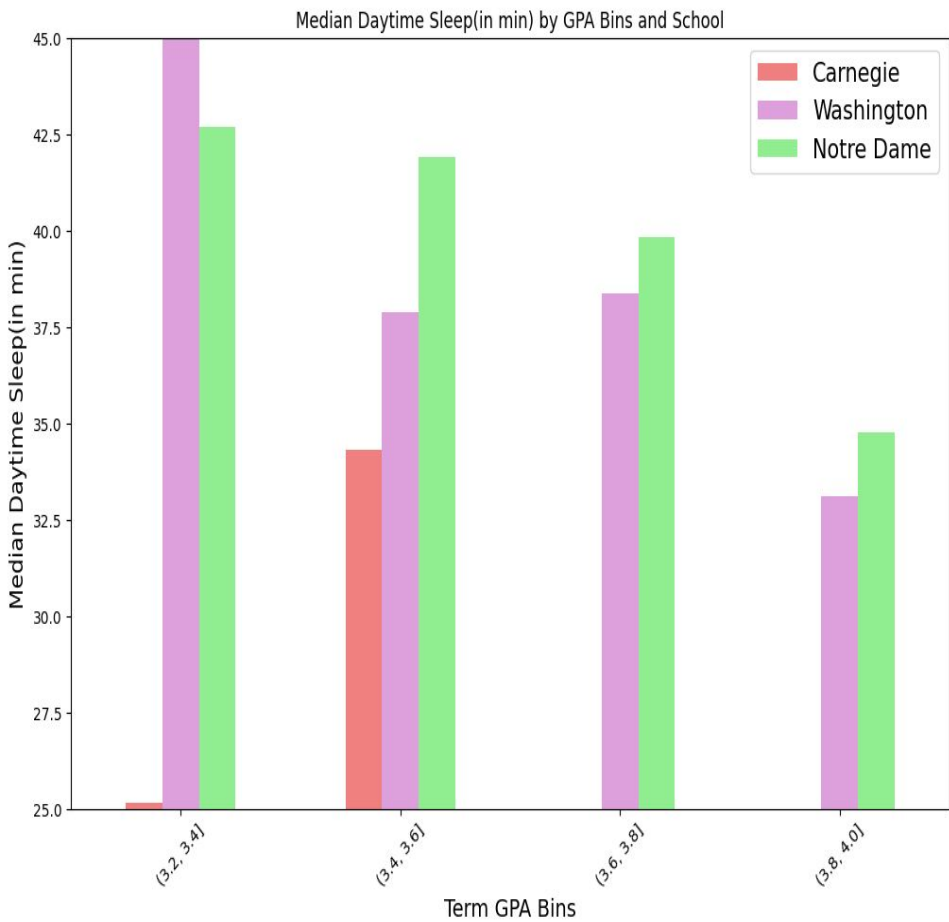Median Bedtime MSSD(in min) by GPA Bins and School

Median vs. Mean Bedtime MSSD(in min) by GPA Bins

Median Daytime Sleep(in min) by GPA Bins and School

Median vs. Mean Daytime Sleep(in min) by GPA Bins

4 Best Features

$$y\_hat = 0.9878 + 0.6808\,(cum\_gpa) - .0798\,(bedtime\_mssd) - .0020\,(daytime\_sleep) + 0.0005\,(TotalSleepTime)$$

Fitted vs. Residuals Plot 4 Features

3 Best Features

$$y\_hat = 1.2033 + 0.6844\,(cum\_gpa) - 0.0910\,(bedtime\_mssd) - 0.0023\,(daytime\_sleep)$$

Fitted vs. Residuals Plot 3 Features

2 Best Features

$$\hat{y} = 1.0711 - .1160\,(\text{bedtime\_mssd}) + .6968\,(\text{cum\_gpa})$$

Fitted vs. Residuals Plot 2 Features
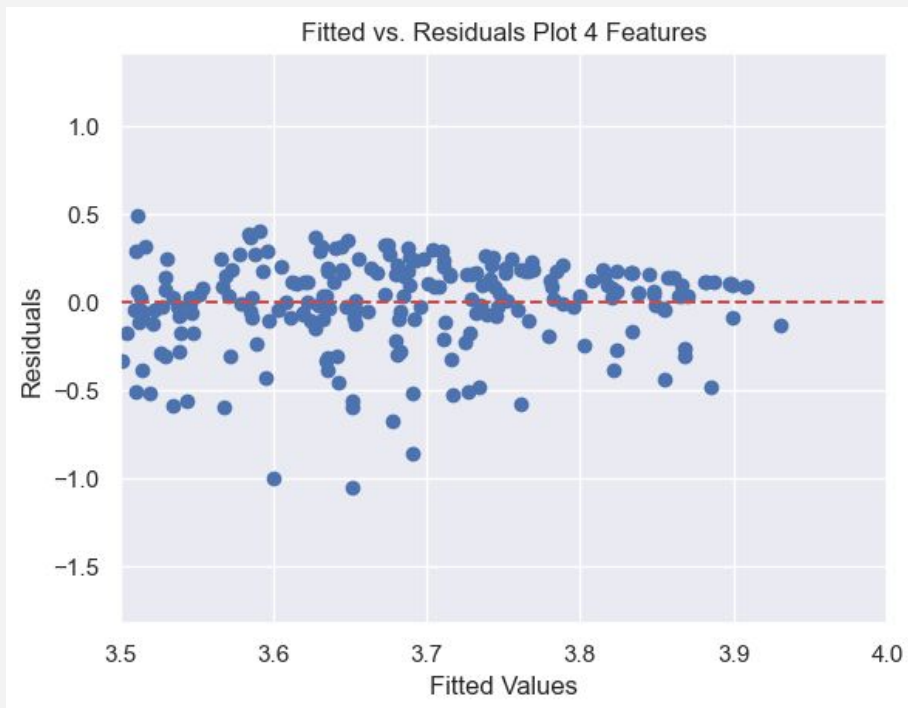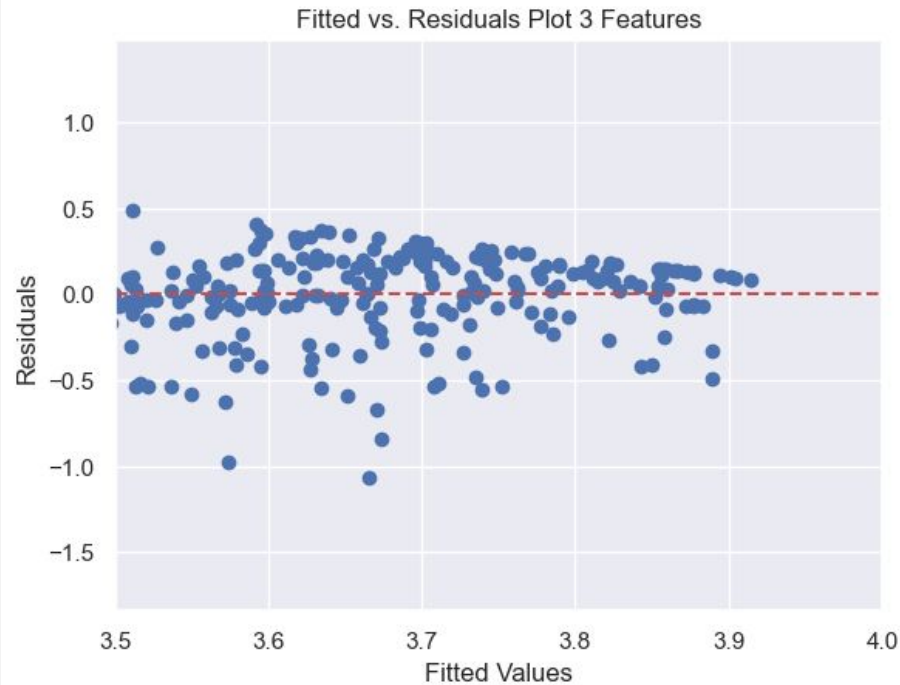

Fitted vs. Residuals Plot 2 Features

4: $\hat{y} = 0.9878 + 0.6808\,(\text{cum\_gpa}) - .0798\,(\text{bedtime\_mssd}) - .0020\,(\text{daytime\_sleep}) + 0.0005\,(\text{TotalSleepTime})$
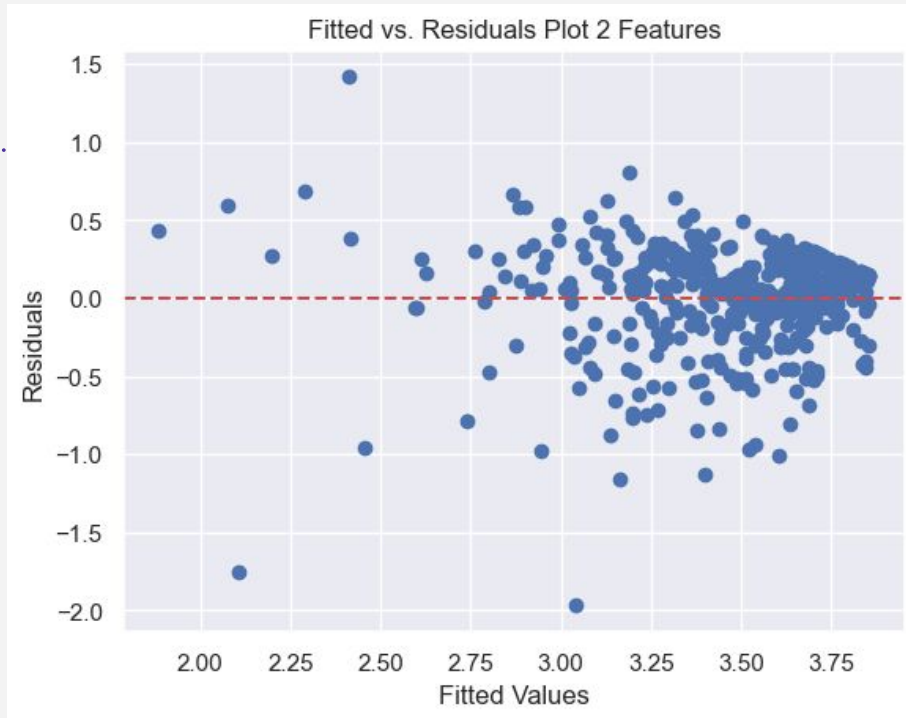

R2 vs. Adj. R2 Among 2 Training Models
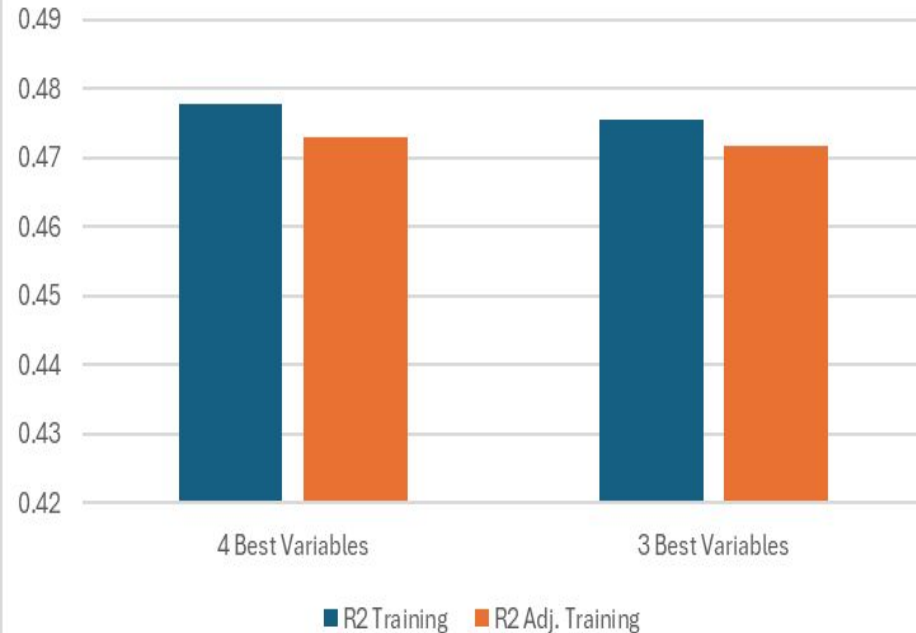
R2 vs. Adj. R2 Among 2 Testing Models

■ R2 Training ■ R2 Adj. Training

■ R2 Test ■ R2 Adj. Test

3: $\hat{y} = 1.2033 + .6844\,(\text{cum\_gpa}) - .0910\,(\text{bedtime\_mssd}) - .0023\,(\text{daytime\_sleep})$

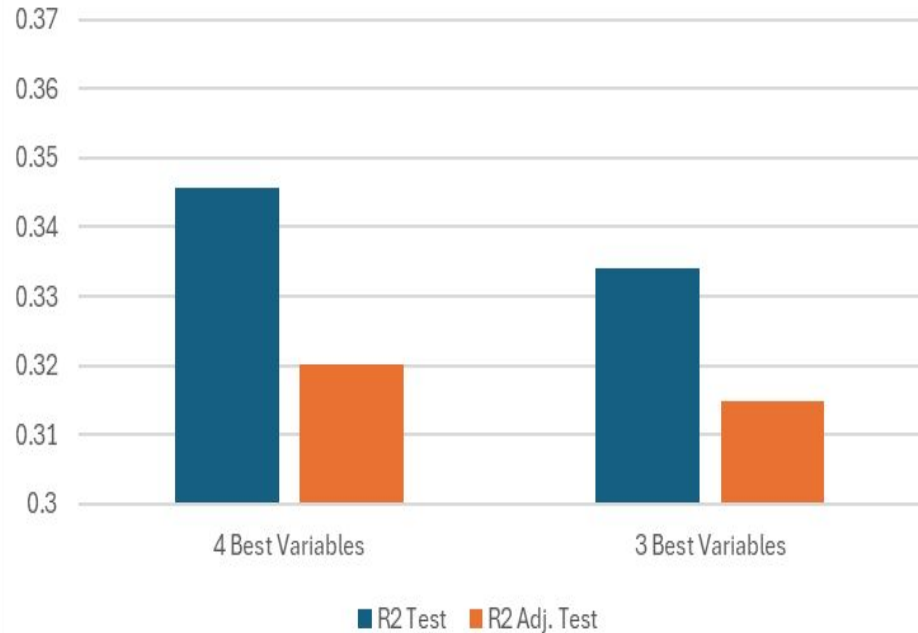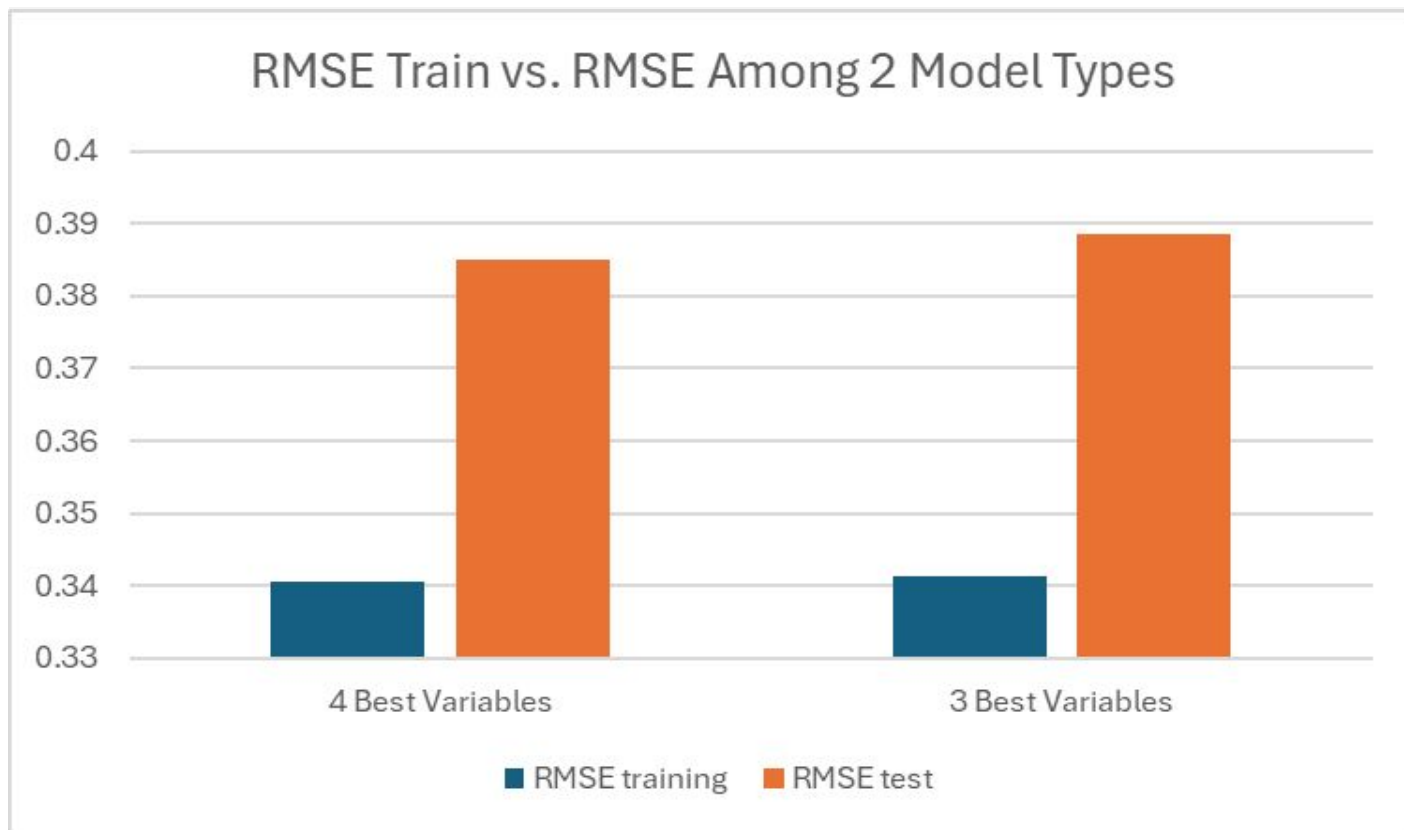4: $\hat{y} = 0.9878 + 0.6808\,(\text{cum\_gpa}) - .0798\,(\text{bedtime\_mssd}) - .0020\,(\text{daytime\_sleep}) + 0.0005\,(\text{TotalSleepTIme})$

RMSE Train vs. RMSE Among 2 Model Types

3: $\hat{y} = 1.2033 + .6844\,(\text{cum\_gpa}) - .0910\,(\text{bedtime\_mssd}) - .0023\,(\text{daytime\_sleep})$

Future investigations

- Compare different demographics!
  - Non-Freshman
  - First Generation Students
  - Gender
- Z_term_units - standardizes credit hours for the three school
  - Dropped due to many missing values
- Gather more data entries
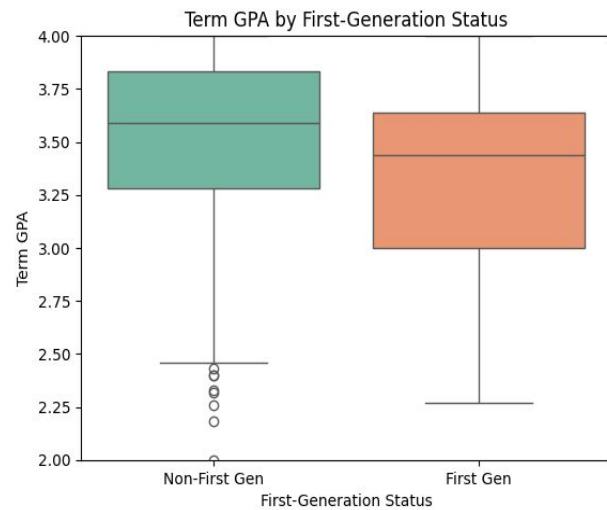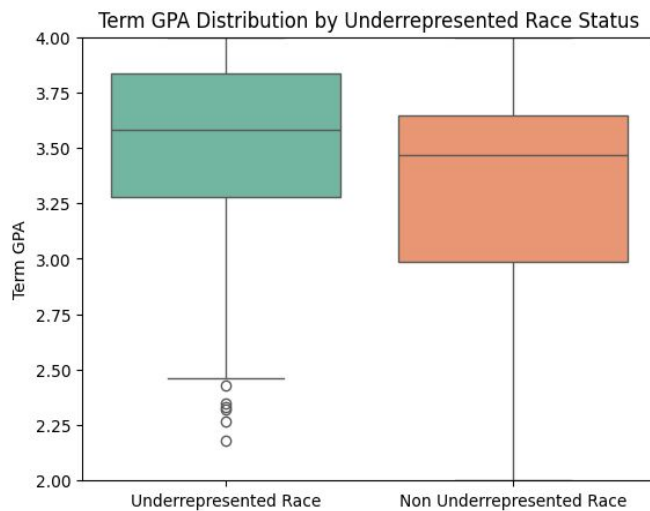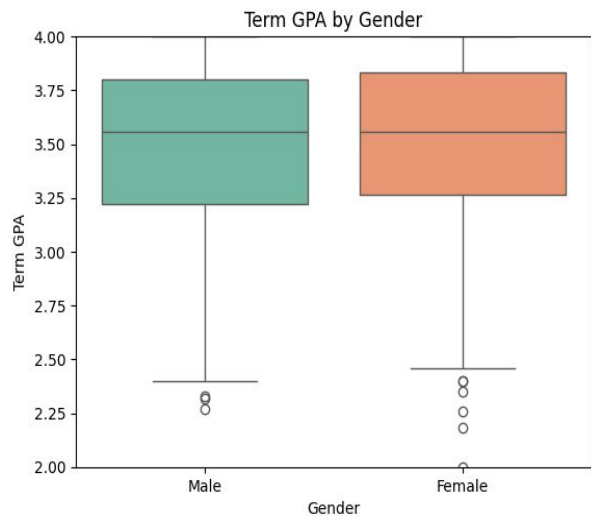
Conclusions

- Sleep does matter! BUT not the sole predictor of someone's GPA
  - Total Sleep was not the important predictor
- Hard to directly relate to ourselves
  - Lots of other factors likely play a part in their GPA that is not accounted for in this dataset
- In a vacuum it might be true but in real life it is more complex