

# THE SURVEY PROBLEM

This survey aims to analyze the relationship between York University students' time allocation habits and their academic performance (GPA). The goal is to determine which factors have the most significant impact on GPA and to compare different sampling methods' effectiveness in estimating GPA.





# YORK UNIVERSIT



This was our population-

- **Units:** York University students
- **Mean GPA:** 6.58 (calculated from dataset)
- **Total Students Surveyed:** 100
- **The largest proportion of study hours/week was: 6-10 hours: 34%**

# COLLECTING REAL DATA



STUDY HOURS  
PER WEEK



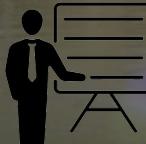
EXERCISE HOURS  
PER WEEK



STRESS LEVELS  
(1-10)



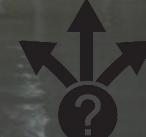
SLEEP HOURS  
PER DAY



LECTURE ATT  
(%)



SCREEN TIME  
(HRS PER DAY)



DECISION TO  
CHANGE  
DEGREE (Y/N)

# SAMPLE FACTORS...



**Sample Size:**  
100 students

**Sampling Frame:**  
York University  
Students from various  
programs and years

**Survey Method:**  
In person  
questionnaires (as  
demonstrated above)

**Sampling Precision  
Consideration:**

**Simple Random  
Sampling (SRS) as a  
baseline method**

**Stratified Sampling  
(Proportional  
Allocation & Neyman  
Allocation) to improve  
estimation accuracy**

# SIMPLE RANDOM SAMPLING (SRS)

Method 1: Randomly selecting 30 students from the dataset (SRS).

- Goal: Estimate the population mean GPA.

$$\hat{\mu} = \frac{1}{n} \sum_{i=1}^n X_i$$

where  $X_i$  represents individual GPA values in the sample.

- Results:
  - Mean GPA (SRS estimate): 6.52
  - Variance (SRS estimate): 1.74

# STRATIFIED SAMPLING

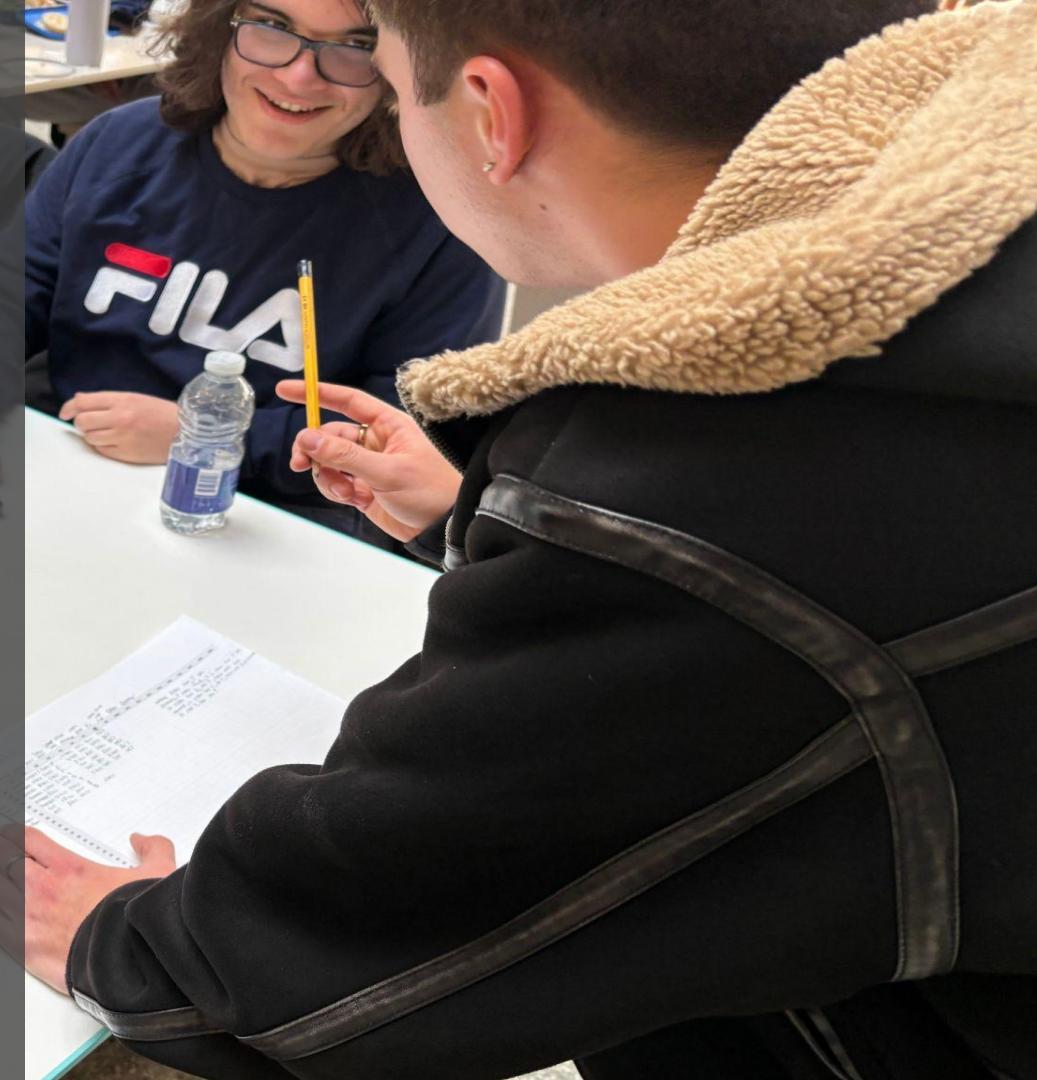
Method 2: Proportional Allocation (PA)

- Mean GPA (PA estimate): 6.61
- Variance (PA estimate): 1.52

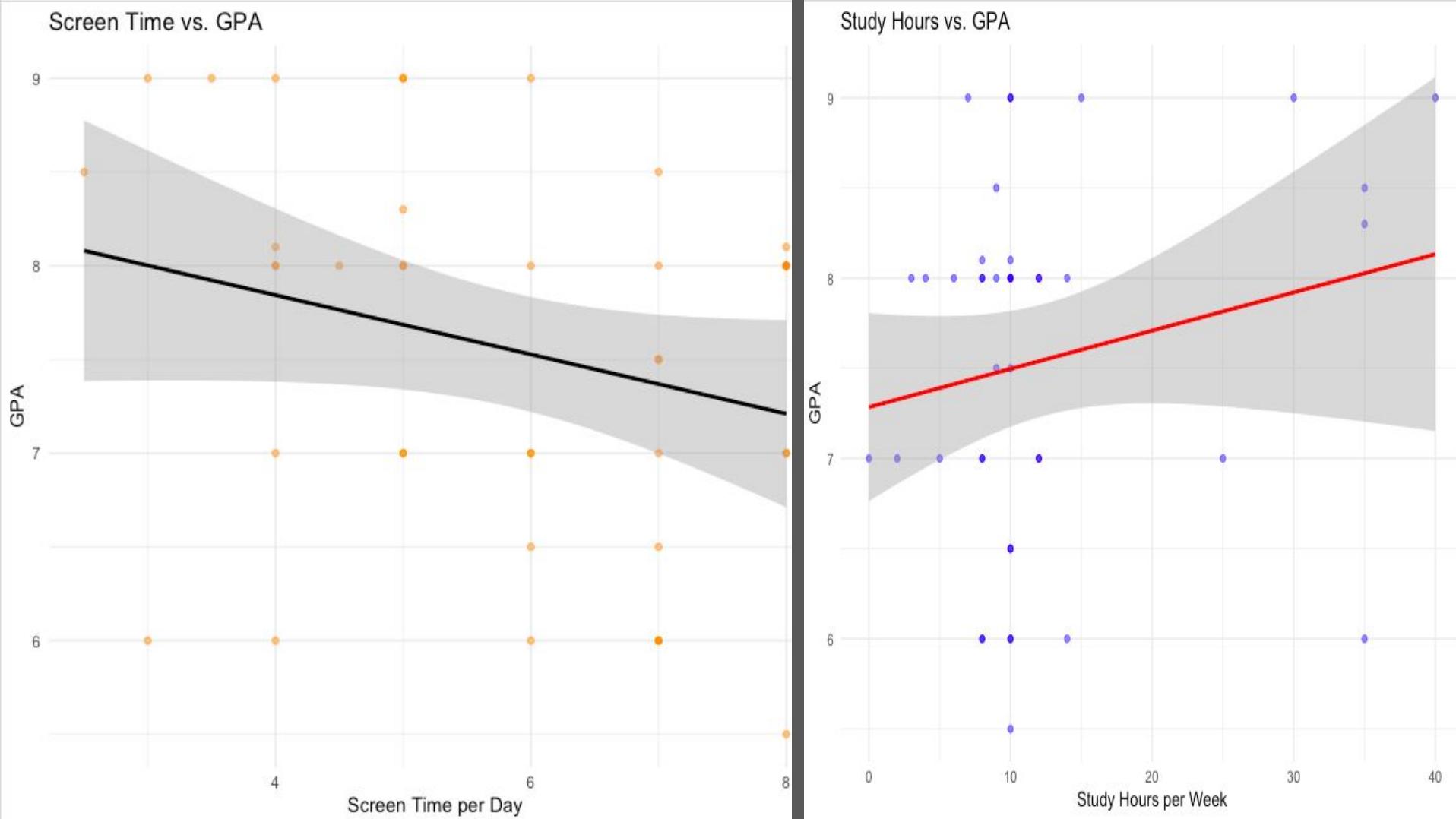
Method 3: Neyman Allocation (NA)

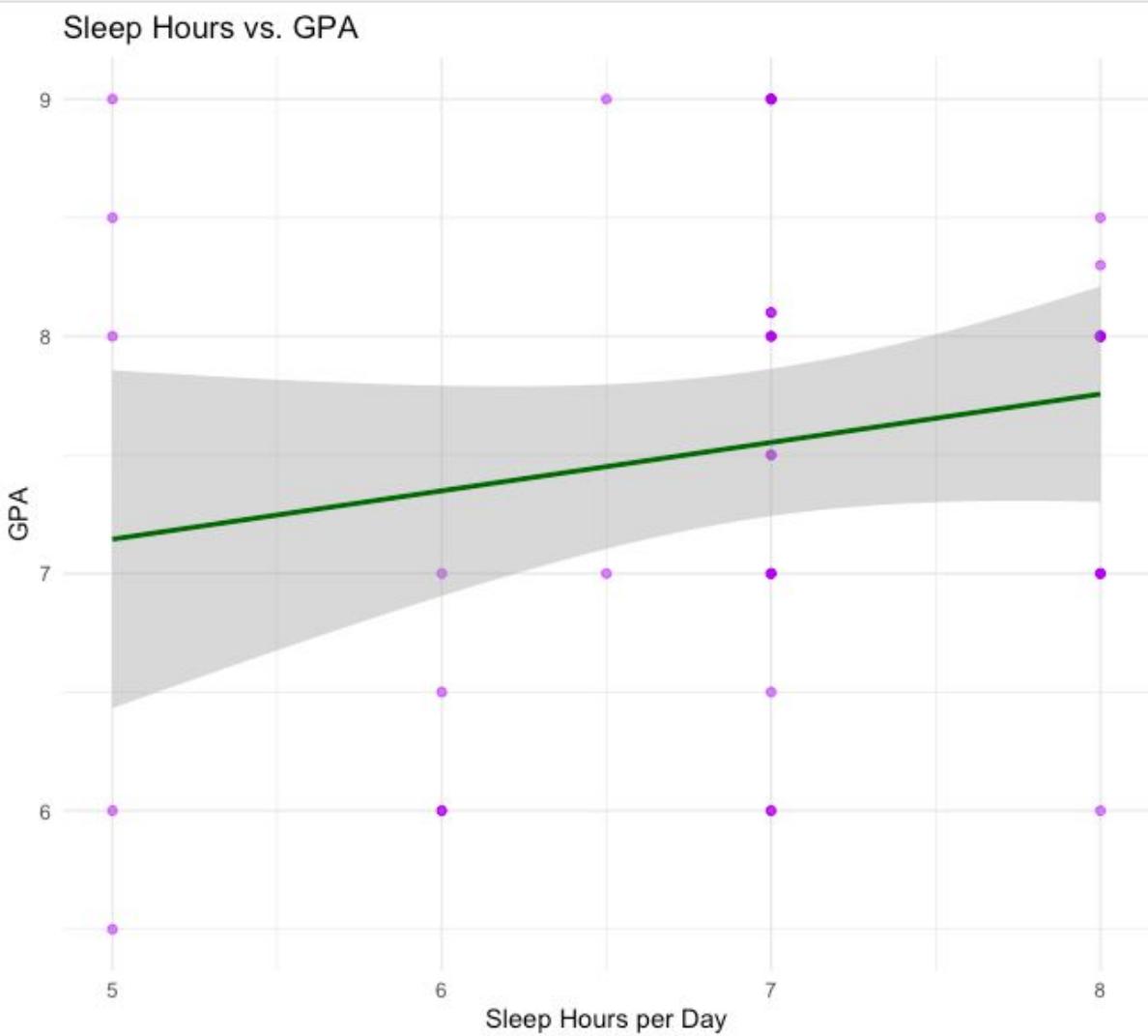
- The sample size is weighted based on variability within each stratum.
- Mean GPA (NA estimate): 6.65
- Variance (NA estimate): 1.48

# HERE'S OUR CODES



	A	B	C	D	E	F	G	H	I	J
1	Student_number	GPA	Program	Study_hours_week	Exercise_hours_week	Stress_1_to_10	Sleep_hours_day	Lecture_attendance_percent	Screen_time_hours_day	Would_you_change_your_degree
2	1	6	Biology	2	6	4	6	80	6	No
3	2	6	Psychology	2	0	6	7	100	9	No
4	3	8	Psychology	10	7	8	8	100	8	Yes
5	4	7	Psychology	8	1	5	8	70	7	Yes
6	5	4	Chemistry	8	4	6	3	70	7	No
7	6	8	Psychology	21	5	6	8	100	8.5	No
8	7	5	Psychology	15	20	4	6	60	10	No
9	8	7.5	Engineering	35	6	7	5	100	2	No
10	9	6	Engineering	14	6	4	7	95	3	No
11	10	8	Engineering	32	10	5	10	60	5	No
12	11	5	Biology	0	0	5	2	75	5	No
13	12	8.5	Engineering	32	8	6	5	100	5	No
14	13	6	Engineering	20	7	6	6	95	7	Yes
15	14	5.5	Engineering	10	5	4	5	95	8	Yes
16	15	8	Architecture	0	4	1	6	60	3	No
17	16	7	Business	0	8	2	8	90	6	No
18	17	9	Teaching	2	4	1	8	90	3	No
19	18	4	Social Work	0.5	3	10	9	100	6	Yes
20	19	8	Neuroscience	20	6	7	6	95	6.5	No
21	20	6	Psychology	4	3	10	6	20	9.5	No
22	21	9	Biology	20	13	6	4	95	11	No
23	22	2	Culinary	35	0	7	6	95	9	Engineering
24	23	5.5	Computer Sc	1	7	6	7	90	13.5	No
25	24	7	Kinesiology	5	7	5	7	90	6	No
26	25	7.5	Nursing	9	3	7	7	65	7	Kinesiology
27	26	6	Biology	10	5	7	7	70	9	No
28	27	8	Psychology	15	5	5	7	90	6	No
29	28	8	Business	19	5	2	7	80	6	No
30	29	7	Engineering	2	5	9	7	100	8	No
31	30	8	Psychology	8	6	9	7	80	5	No
32	31	6	Engineering	10	7	7	5	100	1	No
33	32	6	Engineering	10	3	8	4	80	8	Yes
34	33	6	Engineering	8	4	1	5	80	7	No





# In Conclusion,

 **Best Strata:** Balanced sleep (7-8 hours), moderate study hours (11-15), and low screen time (0-2 hours) tend to have the highest GPA (9.00).

 **Worst Strata:** Excessive screen time (9-12 hours) combined with low sleep (0-4 hours) results in the lowest GPA (~5.00).

- **Strongest negative factor:** Screen time (-0.27 correlation).
- **Strongest positive factor:** Sleep (+0.19 correlation).
- **Neyman Allocation Stratified sampling** provides better precision than SRS



# CHALLENGES

## Acquisition of data:

- Sampling on Friday skewed lecture attendance
- Students round up GPA to appear smarter

## Analysis of data:

- Lower amount of data lend to small stratum
- Scalability of the variable affects analysis