Purdue Student College Affiliation Impact on Sleeping Habits

Research conducted by Alexa Belegrin, Kian Farahbakhshian, Megan Nichols

Problem

- Purdue engineers are significantly more vocal about their lack of sleep than other students
- Unhealthy sleep habits become a competition
  - Pulling all-nighters is common
  - Bragging about how little sleep one gets
  - Sleeping in libraries, classes, etc. is also common
- Other factors such as alcohol consumption, social life, general well-being, and extracurricular activities can affect sleep
- As Purdue Multidisciplinary Engineers ourselves, we have perceived that there is a difference between majors and we want a more objective view on the subject
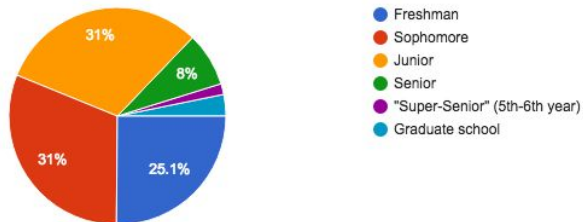 - As Multidisciplinary Engineers, we interact with students in various colleges at Purdue

Data Description

What is your current class standing?
187 responses

- Freshman
- Sophomore
- Junior
- Senior
- "Super-Senior" (5th-6th year)
- Graduate school

Junior: 31%
Senior: 8%
Sophomore: 31%
Freshman: 25.1%

How many credit hours do you currently take?
187 responses

- Less than 12 credit hours
- 12-13 credit hours
- 14-15 credit hours
- 16-18 credit hours
- More than 18 credit hours
- 15-18 credit hours
- 13-15 credit hours

29.4%
10.2%
50.8%
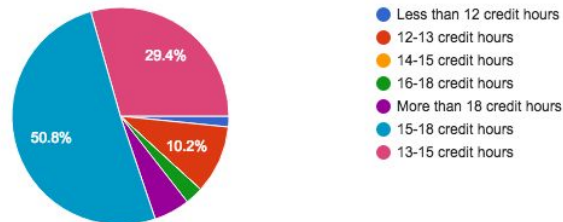
On average, how many hours of sleep do you get each night during the school week?
187 responses

- Less than 4 hours
- 4-5 hours
- 6-7 hours
- 8-9 hours
- More than 9 hours

58.3%
25.1%
15.5%
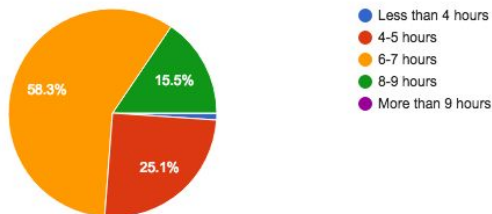
How many hours do you spend on coursework each week? (Note: 2-3 hours of study time for each hour that you spend in class is recommended)
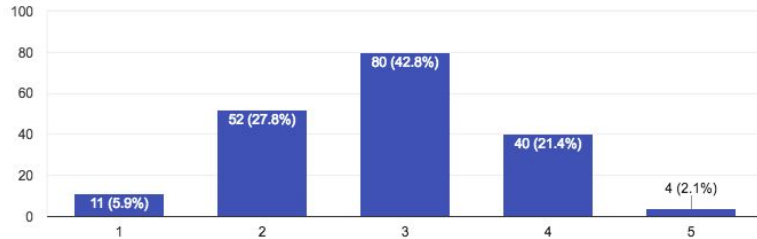187 responses

- 0-5 hours
- 6-10 hours
- 11-15 hours
- 16-20 hours
- 21-25 hours
- 26-30 hours
- More than 30 hours
- 16-30 hours
- 21-15 hours

11.2%
15.5%
7.5%
8.6%
13.9%
21.4%
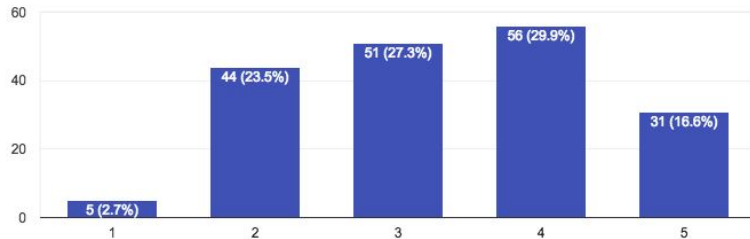21.4%
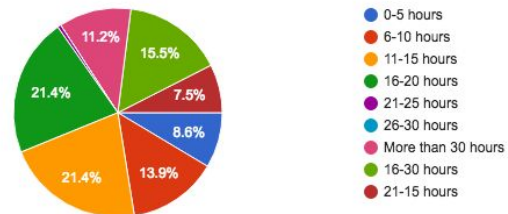
Data Description

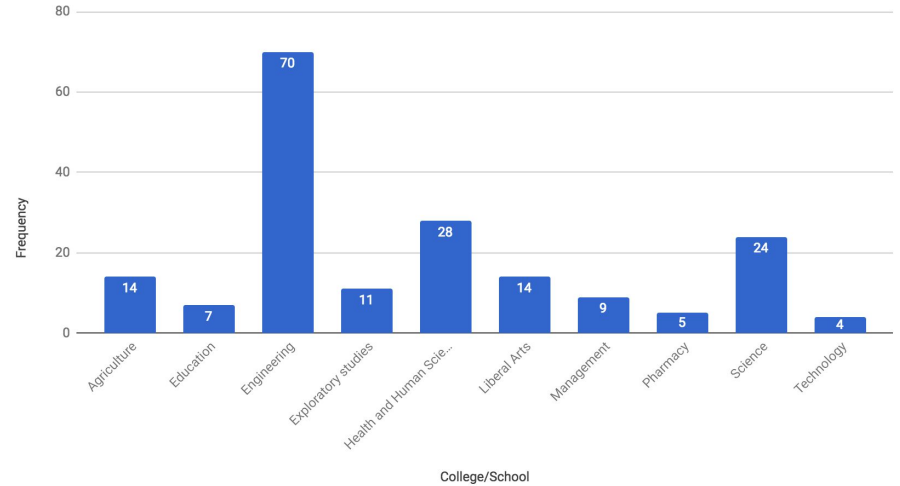## On a scale of 1 to 5, how well rested are you when you wake up?
187 responses

On a scale from not significant to extremely significant, how would you describe the impact of your major and ...lated coursework on your sleep cycle?
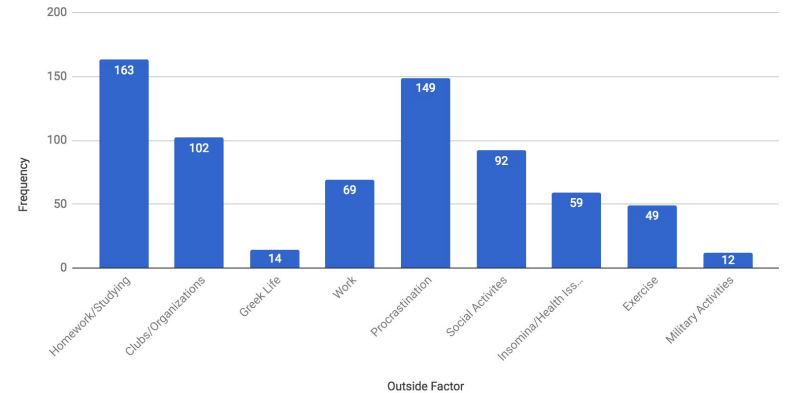187 responses

Colleges and Schools Distribution

Frequency of Outside Factors on Sleep

Methods

The Null and Alternative Hypotheses:

$$H_0 : \tau_1 = \tau_2 = ... = \tau_a = 0$$
$$H_1 : \tau_i \neq 0$$

for at least one τ_i, where τ_i is the treatment effect pertaining to each college

Assumptions:
- Majors within a college are similar enough to be grouped together (i.e. most engineers have similar workloads, Krannert students have similar workloads, etc.)
- Survey participants were representative of the Purdue student body
- Survey participants accurately reported their answers

Assumptions for using ANOVA:
- Values for each treatment (college) are normally distributed
- Variances are the same for each treatment (college)
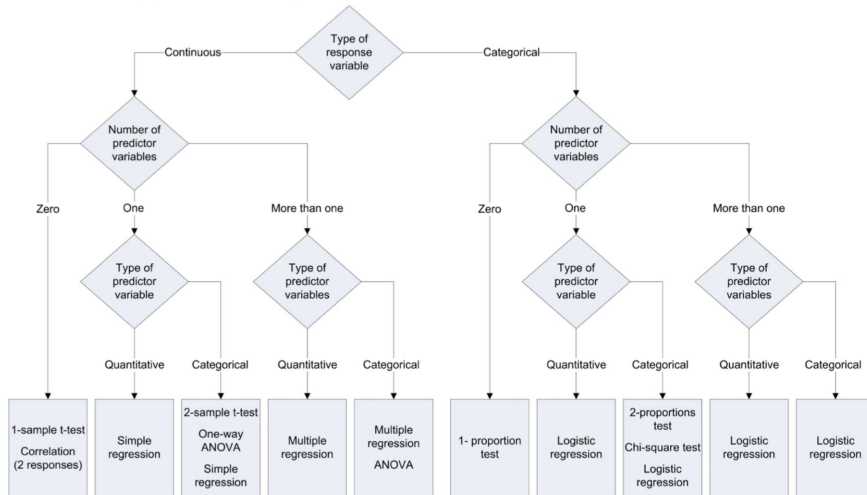- Random selection

Test Statistic:
- ANOVA, F-Test

Methods

Choosing an Analysis

Testing Hypotheses on More Than Two Means (ANOVA)

$$MS_{\text{Treatments}} = \frac{SS_{\text{Treatments}}}{a - 1} \qquad\qquad E(MS_{\text{Treatments}}) = \sigma^2 + \frac{n \sum_{i=1}^{a} \tau_i^2}{a - 1}$$

$$MS_E = \frac{SS_E}{a(n - 1)} \qquad\qquad E(MS_E) = \sigma^2$$

Null hypothesis: $H_0: \tau_1 = \tau_2 = \cdots = \tau_a = 0$

Alternative hypothesis: $H_1: \tau_i \neq 0 \qquad$ for at least one i

Test statistic: $F_0 = \dfrac{MS_{\text{Treatments}}}{MS_E}$

P-value: Probability beyond f_0 in the $F_{a-1,\, a(n-1)}$ distribution

Rejection criterion
for a fixed-level test: $f_0 > f_{\alpha, a-1, a(n-1)}$

Results

## ANOVA: Hours of Sleep versus Major

Factor Information

Factor	Type	Levels	Values
Major	Fixed	10	Agriculture, Education, Engineering, Exploratory studies, Health and Human Sciences, Liberal Arts, Management, Pharmacy, Science, Technology

Analysis of Variance for Hours of Sleep

Source	DF	SS	MS	F	P
Major	9	46.00	5.111	3.41	0.001
Error	169	253.18	1.498		
Total	178	299.18			

Model Summary

S	R-sq	R-sq(adj)
1.22398	15.38%	10.87%

Histogram of Hours of Sleep

Histogram of Hours Spent on Work
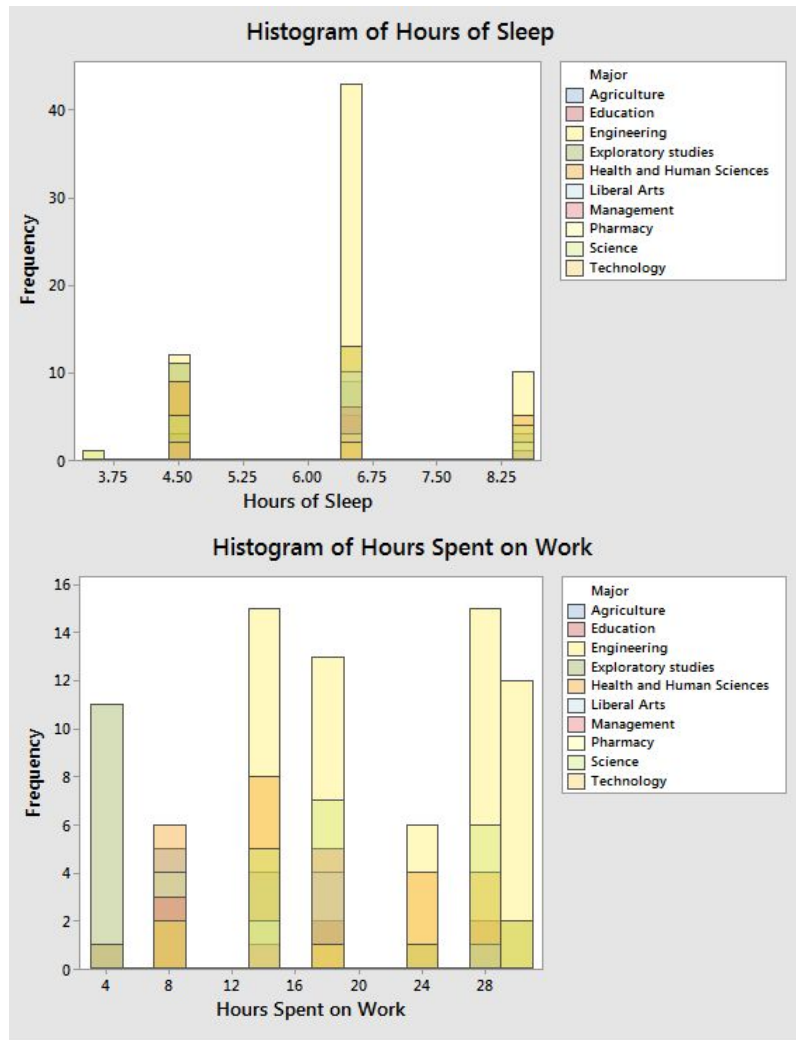
Results Discussion

The p- value of this test was 0.001, which is less than a significance of 5%.

This means that we can reject our null hypothesis. As the null hypothesis is rejected, there is significant evidence to support that sleep varies with college affiliation.

Conclusion

Findings show there is significant difference between sleep habits of students in different colleges.

Out-of-class academic work is the largest contributor to lost sleep.

More research should be done to determine why some colleges require more out of class work and how to modify more strenuous majors to promote healthier sleeping habits.

Questions?

Thank you.