


# Does sleep affect your GPA

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# Introduction

Sleep is very important for a healthy person. It is recommended for teenagers to get 9 - 9.5 hours of sleep a night but the national average amount of sleep that teenagers get is closer to 7 - 7.5 hours of sleep. It can be due to many factors such as technology usage and homework. I'm wondering if the average amount of sleep that Washburn students get affects the GPA of these students.



# Question

Does the average amount of sleep that 100 Washburn students have each night affect their GPA.



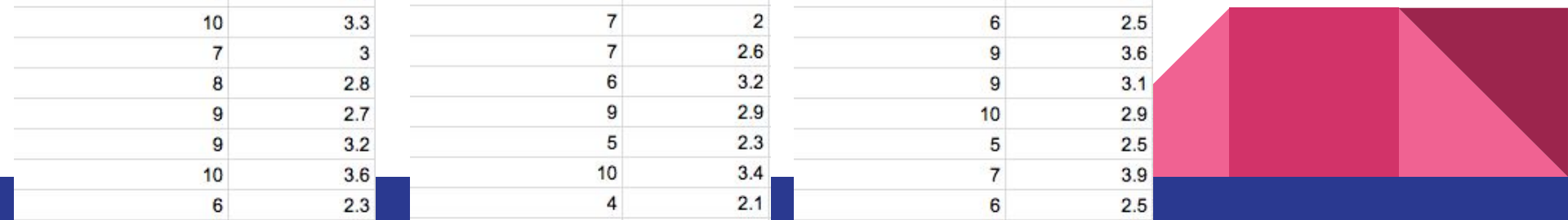
Average hours of sleep	GPA
6	2.5
8	3
7	3.2
6	2.8
9	3.9
5	2.6
7	3.2
8	2.4
8	3.1
8	2.9
6	3.3
9	3
10	3.2
6	2
7	2.7
7	3.1
8	3.1
9	2.9
9	3.6
6	2.4
5	2.8
10	3.3
7	3
8	2.8
9	2.7
9	3.2
10	3.6
6	2.3

6	2.3
8	3.1
6	2.6
10	3.5
8	3.2
6	2.5
6	3.6
7	2.9
9	3.4
6	3.8
6	2.6
8	3.1
10	3.2
7	2.9
6	3
6	2.5
9	3.6
10	2.8
5	1.9
8	2.4
8	1.5
7	3
7	2
7	2.6
6	3.2
9	2.9
5	2.3
10	3.4
4	2.1

8	3.4
9	2.6
9	3.5
7	2.8
6	2.8
8	3.8
8	2.4
6	3.6
7	3.2
9	2.9
7	1.8
7	2.3
9	2.7
8	3.2
8	2.7
6	3.2
6	1.2
9	3.6
5	2.8
9	3.4
7	2.2
7	2.7
6	2.5
9	3.6
9	3.1
10	2.9
5	2.5
7	3.9
6	2.5

9	3.6
5	2.1
9	3.6
8	3.3
8	2.7
7	2.4
6	2.5
6	3.6
8	1.7
6	3.4
7	2.3
6	3.2
5	2.7
9	3

Raw Data



# Procedure:

I went to random classrooms of different grades in Washburn and took 100 surveys of those students on how much sleep they get and what their GPA is

46% of students surveyed had a GPA 3.0 or over

Of those students 36.95% of them slept less than 8 hours a night

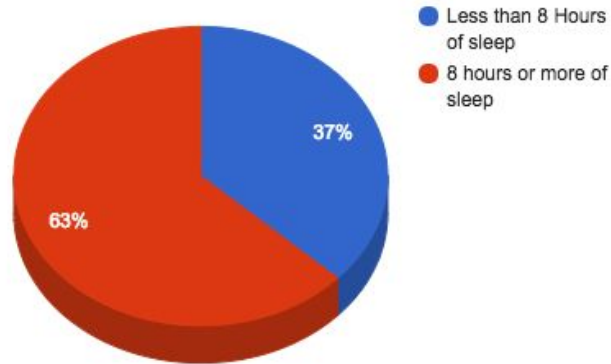
The other 54% of students had a GPA below 3.0

Of those students 66.66% slept less than 8 hours a night

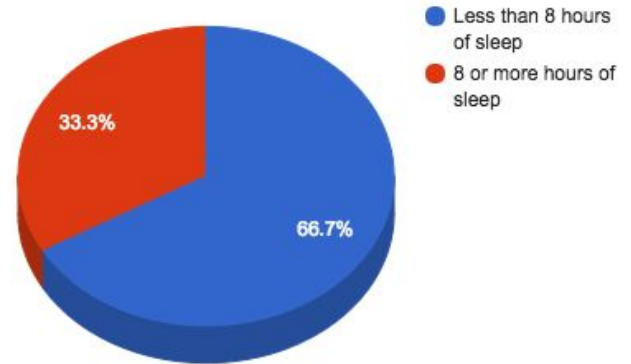


# Graphs

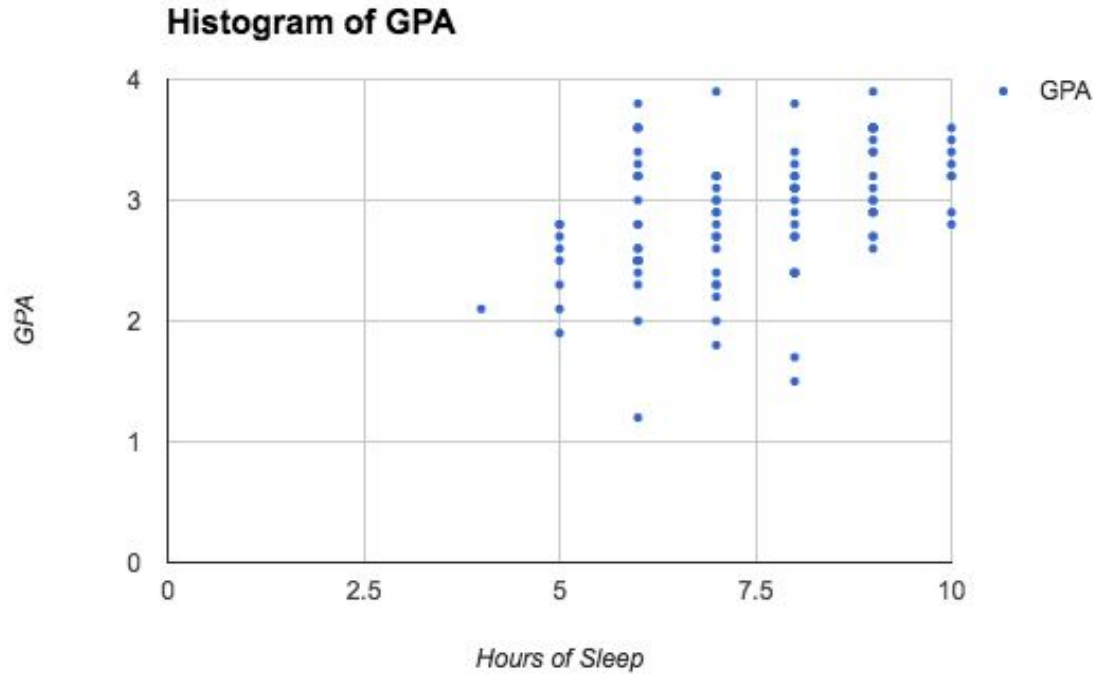
**Average amount of sleep for students with a GPA of 3.0 or higher**



**amount of sleep for students with a sub 3.0 GPA**



# Graphs



# Inference Procedure: Two Proportion Z-Test

**Parameter:** The distribution of students who sleep more than 8 hours a night with a GPA of over 3.0 and the distribution of those who sleep over 8 hours a night who have a GPA of less than 3.0

**Hypothesis:**

$H_0$ : The Proportion of students who sleep under 8 hours a night is the same for students who have a GPA of 3.0 or higher as students with a GPA of less than 3.0

$H_a$ : Students with a GPA of 3.0 or higher will have less students who sleep under 8 hours a night than the students who have less than a 3.0 GPA



# Inference Procedure: Two Proportion Z-Test

## Assumptions/Conditions:

- 1) SRS: I randomly surveyed 100 washburn students on their GPA as well as how much sleep they get on average
- 2) Independence:
  - a)  $N \geq (10)n$   $N \geq (10)(100)$   $N \geq 1000$  It is safe to assume that more than 1000 students go to washburn
- 3) Normality:
  - a)  $\geq 3.0$  GPA:  $(46)(.37) \geq 10$   $17.02 \geq 10$        $(46)(.63) \geq 10$   $28.98 \geq 10$
  - b)  $< 3.0$  GPA:  $(54)(.667) \geq 10$   $36.02 \geq 10$        $(54)(.333) \geq 10$   $17.98 \geq 10$

Name: Two-proportion z-test



# Finding P value

$$|Z = .37 - .667 / \sqrt{((.53)(1 - .53)/46) + ((.53)(1 - .53)/54)}$$

$$Z = -.297 / \sqrt{(.2491/46) + (.2491/54)}$$

$$Z = -.297 / \sqrt{.01}$$

$$Z = -.297 / .1$$

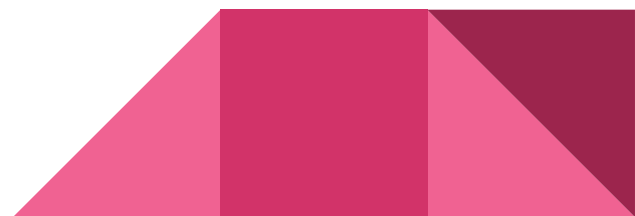
$$Z = -2.97$$

$$P = .0030$$

$$\hat{p} = (17 + 36) / (46 + 54)$$

$$\hat{p} = 53 / 100$$

$$\hat{p} = .53$$



# Decision

The Null hypothesis has been rejected because according to the P value the difference is very statistically significant. I do have proper evidence to say that Students with a GPA of less than a 3.0 are more likely to sleep less than 8 hours a night than those with a 3.0 or higher



# Conclusion

In conclusion it was found that sleep actually does affect your GPA so get your sleep. The two proportion z-test showed that the difference was statistically significant. So get your sleep.



# Potential Problems

- It is a somewhat small sample size so it could vary a lot depending on the people taking the survey.
- There were many outliers with people with low grades getting a lot of sleep and people with good grades who do not get very much sleep so it is not a sure thing.

