

# GPA and Worry in Washburn



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# Introduction

## Questions:

- Is there a correlation between GPA and how much students worry about their grades?
  - We were curious to find out if students are more worried about their GPA and grades if they have a low GPA (and are trying to improve it) or have a high GPA (and are worried about maintaining it).
- Is there a correlation between grade level and how much students worry about their grades?
  - We wanted to see if as students got older (when their GPA would affect college applications, choices, scholarships, decisions, etc.) they cared more about their GPA, leading them to worry more.

# Process

Randomization:

We wanted to make sure that each class that we visited would only have students from one grade, so we focused on English and History classes.

We assigned each class a number from 1-11 and put them into a random number generator, which we generated until we got a class for each grade.

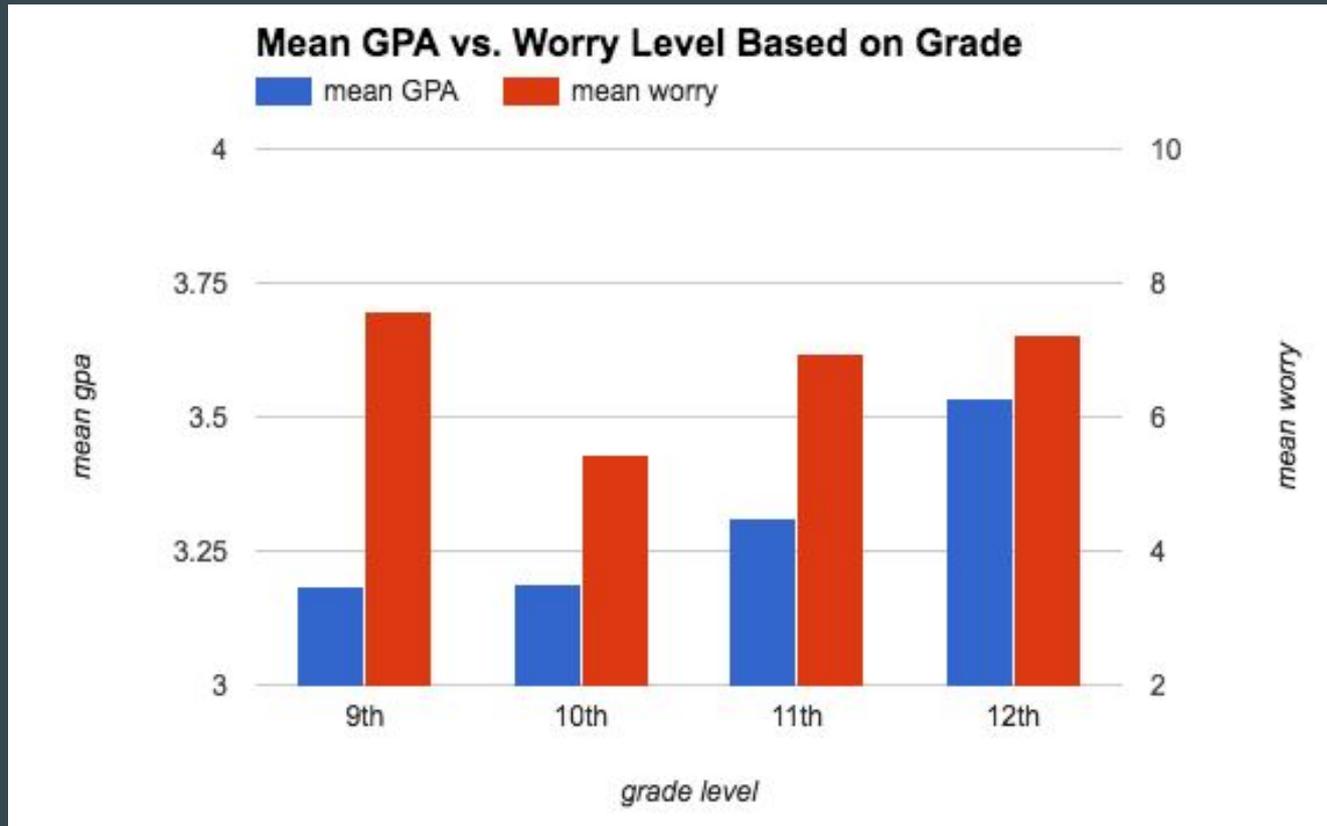
- i.e. Geography = 9th, U.S. History = 10th etc.

# Data

We collected data from classes of 9th, 10th, 11th, and 12th graders.

Grade Level	Mean GPA	Mean Level of Worry
9th	3.184	7.59
10th	3.1868	5.447
11th	3.31	6.9375
12th	3.537	7.238

# Graph



# Calculations

We decided that using chi-squared tests would be the best way to find the information that we were looking for.

We changed our Worry data to be a categorical variable to fit this model.

# Calculations - Chi-Squared Test of Association

Parameters: We are interested in if there is an association between GPA and level of worry

Hypotheses:  $H_0$ : There is no association between GPA and level of worry  $H_a$ : there is an association between GPA and level of worry

Assumptions:

- Random= sample was taken randomly (stratified random sample)
- Independent= 10% condition  $1/10 N > n$   $N > 840$  (more than 840 students at Washburn)
- Large Counts=  $5.793 > 5$   $9.6552 > 5$   $12.552 > 5$   $12.207 > 5$   $20.345 > 5$   $26.448 > 5$

Name: We will use a chi-square test of association

Test Statistic:  $\chi^2 = \sum \frac{(7 - 5.7931)^2}{5.7931} + \frac{(7 - 9.6552)^2}{9.6552} = 1.6939 \quad df= 2$

Obtain P-value = P: 0.4287

Make decision: Because the p-value is not significant at the  $\alpha = .05$  level, we fail to reject the null hypothesis.

State conclusion: There is not strong evidence that there is an association between GPA and level of worry.

# Calculations - Chi Squared Test of Homogeneity

**Parameter:** We are interested in if different high school grades differ with respect to their worry about their grades.

**Null Hypothesis:** 9th, 10th, 11th, and 12th grades are the same with respect to how much they worry about their grades.

**Alternative Hypothesis:** These populations are not the same.

**Test Statistic:**  $\sum \frac{(7-7.91)^2}{7.91} + \frac{(14-13.09)^2}{13.09} + \dots = 4.574$   $df = 3$

**P-Value:** .2058

The P-Value is not significant at the .05  $\alpha$  level, so we fail to reject the null hypothesis. There is not strong evidence that the grades are the same with respect to their worry about their grades.

**Assumptions:** All assumptions are checked off

7.91	13.09
7.15	11.85
8.66	14.34
8.28	13.72

Expected Counts

# Analysis

In both tests, we failed to reject the null hypothesis. There was no association between GPA and worry level, and no significant difference between the worry levels of different grades.

## Possible Reasons:

- 9th graders have had less than a year's worth of grades factored into their GPA. 12th graders have 4 years, which could factor into them having a higher GPA.
- 10th grade had the lowest average worry, where we thought that 9th graders would. This may be because they are not new to high school, but they have not started thinking about post high school options.
- Because the classes were chosen randomly, they were different levels, which could factor into the GPA's and stress levels of the students.

# Conclusion

## Limitations:

- We only sampled a single class for each grade, and the level of difficulty for the classes varied between the grades.
- Some people did not know their exact GPA and had to guess.
- Worry level is a very subjective variable.

## Solutions:

- Sample several classes for each grade level so we get that variability.
- Have time for students to look up their GPA while surveying them.
- Make the scale more specific and give descriptions of each level.